

” **tutorial.do.txt** ”

TITLE: Doconce: Document Once, Include Anywhere
 AUTHOR: Hans Petter Langtangen at Simula Research Laboratory and University of Oslo
 DATE: today

- * When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- * Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like "LaTeX": "<http://refcards.com/docs/silvermanj/amslatex/LaTeXRefCard.v2.0.pdf>", "HTML": "<http://www.htmlcodetutorial.com/>", "reStructuredText": "<http://docutils.sourceforge.net/docs/ref/rst/restructuredtext.html>", "Sphinx": "<http://sphinx.pocoo.org/contents.html>", and "wiki": "<http://code.google.com/p/support/wiki/WikiSyntax>"? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- * Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

===== The Doconce Concept =====

#include "_what_is.do.txt"

===== What Does Doconce Look Like? =====

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- * Bullet lists arise from lines starting with an asterisk.
- * **Emphasized words** are surrounded by asterisks.
- * Words in boldface are surrounded by underscores.
- * Words from computer code are enclosed in back quotes and then typeset `'verbatim (in a monospace font)'`.
- * Section headings are recognized by equality (`'='`) signs before and after the title, and the number of `'='` signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- * Paragraph headings are recognized by a double underscore before and after the heading.

” **tutorial.do.txt** ”

- * The abstract of a document starts with `*Abstract*` as paragraph heading, and all text up to the next heading makes up the abstract,
- * Blocks of computer code can easily be included by placing `'!bc'` (begin code) and `'!ec'` (end code) commands at separate lines before and after the code block.
- * Blocks of computer code can also be imported from source files.
- * Blocks of LaTeX mathematics can easily be included by placing `'!bt'` (begin TeX) and `'!et'` (end TeX) commands at separate lines before and after the math block.
- * There is support for both LaTeX and text-like inline mathematics.
- * Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- * Invisible comments in the output format can be inserted throughout the text (`'#'` at the beginning of a line).
- * Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- * There is special support for advanced exercises features.
- * With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- * With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
!bc
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- * item 1
- * item 2
- * item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `"hpl":"http://folk.uio.no/hpl"`. If the word is URL, the URL itself becomes the link name, as in `"URL":"tutorial.do.txt"`.

References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to

tutorial.do.txt

Section `ref{my:first:sec}`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Section `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

lines beginning with # are comment lines

!ec

The Doconce text above results in the following little document:

==== A Subsection with Sample Text ====

`label{my:first:sec}`

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- * item 1
- * item 2
- * item 3

Lists can also have numbered items instead of bullets, just use an `'o'` (for ordered) instead of the asterisk:

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `"hpl":"http://folk.uio.no/hpl"`. If the word is URL, the URL itself becomes the link name, as in `"URL":"tutorial.do.txt"`.

References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to Section `ref{my:first:sec}`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Section `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919

tutorial.do.txt

4.0	1.1E+1	14.717624

==== Mathematics and Computer Code ====

Inline mathematics, such as $\nu = \sin(x)$ or $v = \sin(x)$, allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like $\nu = \sin(x)$ or $v = \sin(x)$ is typeset as

```
!bc
 $\nu = \sin(x)$  or  $v = \sin(x)$ 
!ec
```

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (begin tex / end tex) instructions.

The result looks like this:

```
!bt
\begin{eqnarray}
\{\partial u \over \partial t\} &=& \nabla^2 u + f, \text{label{myeq1}} \\
\{\partial v \over \partial t\} &=& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
!et
```

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like

```
!bc cod
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
!ec
```

A code block must come after some plain sentence (at least for successful output to `'sphinx'`, `'rst'`, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `!bc xxx` where `'xxx'` is an identifier like `'pycod'` for code snippet in Python, `'sys'` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `'ptex2tex'` and defined in a configuration file `'.ptext2tex.cfg'`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
!bc
# sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
!ec
```

By default, `'pro'` and `'cod'` are `'python'`, `'sys'` is `'console'`, while `'xpro'` and `'xcod'` are computer language specific for `'x'` in `'f'` (Fortran), `'c'` (C), `'cpp'` (C++), `'pl'` (Perl), `'m'` (Matlab),

” **tutorial.do.txt** ”

`'sh'` (Unix shells), `'cy'` (Cython), and `'py'` (Python).

(Any sphinx code-block comment, whether inside verbatim code
blocks or outside, yields a mapping between bc arguments
and computer languages. In case of multiple definitions, the
first one is used.)

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `'!bc pro'`, while a part of a file is copied into a `'!bc cod'` environment. What `'pro'` and `'cod'` mean is then defined through a `'.ptex2tex.cfg'` file for LaTeX and a `'sphinx code-blocks'` comment for Sphinx.

Another document can be included by writing `'#include "mynote.do.txt"'` on a line starting with (another) hash sign. Doconce documents have extension `'do.txt'`. The `'do'` part stands for doconce, while the trailing `'.txt'` denotes a text document so that editors gives you the right writing environment for plain text.

===== Macros (Newcommands), Cross-References, Index, and Bibliography =====
label{newcommands}

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name `'newcommand_replace.tex'` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `'newcommands.tex'` and `'newcommands_keep.tex'` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `'!bt'` and `'!et'` in `'newcommands_keep.tex'` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `'newcommands_replace.tex'` and expanded by Doconce. The definitions of newcommands in the `'newcommands*.tex'` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `'doc/manual/manual.do.txt'` file (see the "demo page": ["https://doconce.googlecode.com/hg/doc/demos/manual/index.html"](https://doconce.googlecode.com/hg/doc/demos/manual/index.html) for various formats of this document).

”

tutorial.do.txt

”

```
# Example on including another Doconce file (using preprocess):
```

```
# #include "_doconce2anything.do.txt"
```

```
===== Demos =====
```

The current text is generated from a Doconce format stored in the file

```
!bc
```

```
docs/tutorial/tutorial.do.txt
```

```
!ec
```

The file 'make.sh' in the 'tutorial' directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, 'tutorial.do.txt' is the starting point. Running 'make.sh' and studying the various generated files and comparing them with the original 'tutorial.do.txt' file, gives a quick introduction to how Doconce is used in a real case.

"Here": "<https://doconce.googlecode.com/hg/doc/demos/tutorial/index.html>" is a sample of how this tutorial looks in different formats.

There is another demo in the 'docs/manual' directory which translates the more comprehensive documentation, 'manual.do.txt', to various formats. The 'make.sh' script runs a set of translations.

```
# #include "../manual/_install.do.txt"
```

Doconce: Document Once, Include Anywhere

Hans Petter Langtangen^{1,2}

¹Simula Research Laboratory

²University of Oslo

Feb 27, 2012

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, \LaTeX , HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like [LaTeX](#), [HTML](#), [reStructuredText](#), [Sphinx](#), and [wiki](#)? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

1 The Doconce Concept

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, \LaTeX , PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via `rst2*` programs) go to XML, HTML, \LaTeX , PDF, OpenOffice, and from the latter (via `unoconv`) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, \LaTeX , HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.

2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: "Write once, include anywhere".

Here are some Doconce features:

- Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than \LaTeX and HTML.
- Doconce can be converted to plain *untagged* text, often desirable for computer programs and email.
- Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- Doconce has full support for \LaTeX math, and integrates very well with big \LaTeX projects (books).
- Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, \LaTeX , and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- Large books written in \LaTeX , but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as \LaTeX integrated in, e.g., a thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover,

Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, \LaTeX , Sphinx, and similar formats.

2 What Does Doconce Look Like?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- Bullet lists arise from lines starting with an asterisk.
- *Emphasized words* are surrounded by asterisks.
- **Words in boldface** are surrounded by underscores.
- Words from computer code are enclosed in back quotes and then typeset `verbatim` (in a monospace font).
- Section headings are recognized by equality (=) signs before and after the title, and the number of = signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- Paragraph headings are recognized by a double underscore before and after the heading.
- The abstract of a document starts with *Abstract* as paragraph heading, and all text up to the next heading makes up the abstract,
- Blocks of computer code can easily be included by placing `bc!` (begin code) and `ec!` (end code) commands at separate lines before and after the code block.
- Blocks of computer code can also be imported from source files.
- Blocks of \LaTeX mathematics can easily be included by placing `bt!` (begin TeX) and `et!` (end TeX) commands at separate lines before and after the math block.
- There is support for both \LaTeX and text-like inline mathematics.
- Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- Invisible comments in the output format can be inserted throughout the text (`#` at the beginning of a line).

- Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- There is special support for advanced exercises features.
- With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====
label{my:first:sec}

Ordinary text looks like ordinary text, and the tags used for
boldface words, *emphasized* words, and 'computer' words look
natural in plain text. Lists are typeset as you would do in an email,

    * item 1
    * item 2
    * item 3

Lists can also have automatically numbered items instead of bullets,

    o item 1
    o item 2
    o item 3

URLs with a link word are possible, as in "hpl":"http://folk.uio.no/hpl".
If the word is URL, the URL itself becomes the link name,
as in "URL":"tutorial.do.txt".

References to sections may use logical names as labels (e.g., a
"label" command right after the section title), as in the reference to
Section ref{my:first:sec}.

Doconce also allows inline comments such as [hpl: here I will make
some remarks to the text] for allowing authors to make notes. Inline
comments can be removed from the output by a command-line argument
(see Section ref{doconce2formats} for an example).

Tables are also supported, e.g.,

|-----|
|time | velocity | acceleration |
|-----r-----r-----r-----|
| 0.0 | 1.4186 | -5.01 |
| 2.0 | 1.376512 | 11.919 |
| 4.0 | 1.1E+1 | 14.717624 |
|-----|

# lines beginning with # are comment lines
```

The Doconce text above results in the following little document:

2.1 A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and `computer` words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in [hpl](#). If the word is URL, the URL itself becomes the link name, as in [tutorial.do.txt](#).

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to Section 2.1.

Doconce also allows inline comments such as (**hpl**: *here I will make some remarks to the text*) for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Section 3 for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

2.2 Mathematics and Computer Code

Inline mathematics, such as $\nu = \sin(x)$, allows the formula to be specified both as \LaTeX and as plain text. This results in a professional \LaTeX typesetting, but in other formats the text version normally looks better than raw \LaTeX mathematics with backslashes. An inline formula like $\nu = \sin(x)$ is typeset as

```
 $\nu = \sin(x)$  $v = \sin(x)$ 
```

The pipe symbol acts as a delimiter between \LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw \LaTeX , inside `bt!` and `et!` (`begin tex` / `end tex`) instructions. The result looks like this:

$$\frac{\partial u}{\partial t} = \nabla^2 u + f, \tag{1}$$

$$\frac{\partial v}{\partial t} = \nabla \cdot (q(u) \nabla v) + g \tag{2}$$

Of course, such blocks only look nice in \LaTeX . The raw \LaTeX syntax appears in all other formats (but can still be useful for those who can read \LaTeX syntax).

You can have blocks of computer code, starting and ending with `bc!` and `ec!` instructions, respectively. Such blocks look like

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to `sphinx`, `rst`, and ASCII-close formats), not directly after a section-/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `bc xxx!` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to \LaTeX , these identifiers are used as in `ptex2tex` and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), `pl` (Perl), `m` (Matlab), `sh` (Unix shells), `cy` (Cython), and `py` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `bc pro!`, while a part of a file is copied into a `bc cod!` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for \LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors give you the right writing environment for plain text.

2.3 Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a \LaTeX -style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for \LaTeX (since \LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands \LaTeX

math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `bt!` and `et!` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw \LaTeX math text easier to read in the formats that cannot render \LaTeX . Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the \LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of \LaTeX , making it easy for Doconce documents to be integrated in \LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `doc/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

3 From Doconce to Other Formats

Transformation of a Doconce document `mydoc.do.txt` to various other formats applies the script `doconce format`:

Terminal

```
Terminal> doconce format format mydoc.do.txt
```

or just

Terminal

```
Terminal> doconce format format mydoc
```

The `mako` or `preprocess` programs are always used to preprocess the file first, and options to `mako` or `preprocess` can be added after the filename. For example,

Terminal

```
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5      # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5  # mako
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `latex`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "latex"`.

Inline comments in the text are removed from the output by

Terminal

```
Terminal> doconce format latex mydoc --skip_inline_comments
```

One can also remove all such comments from the original Doconce file by running:

```
Terminal> doconce remove_inline_comments mydoc
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

3.1 HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by

Terminal

```
Terminal> doconce format html mydoc
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

3.2 Pandoc

Output in the versatile Pandoc format results from

Terminal

```
Terminal> doconce format pandoc mydoc
```

The name of the output file is `mydoc.pnd`. From this format one can go to numerous other formats:

Terminal

```
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
```

Pandoc supports latex, html, odt (OpenOffice), docx (Microsoft Word), rtf, texinfo, to mention some. The `-R` option makes Pandoc pass raw HTML or \LaTeX to the output format instead of ignoring it. See the [Pandoc documentation](#) for the many features of the `pandoc` program.

3.3 \LaTeX

Making a \LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps:

Step 1. Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:

Terminal

```
Terminal> doconce format latex mydoc
```

LaTeX-specific commands ("newcommands") in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see Section 2.3). If these files are present, they are included in the \LaTeX document so that your commands are defined.

Step 2. Run `ptex2tex` (if you have it) to make a standard \LaTeX file,

Terminal

```
Terminal> ptex2tex mydoc
```

or just perform a plain copy,

Terminal

```
Terminal> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros that can be used to steer certain properties of the \LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run

Terminal

```
Terminal> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard \LaTeX "maketitle" heading is also available through

Terminal

```
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
```

A separate titlepage can be generate by

Terminal

```
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in \LaTeX documents. After any `bc!` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `bc cod!` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

Step 3. Compile `mydoc.tex` and create the PDF file:

Terminal

```
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
Terminal> latex mydoc
Terminal> dvipdf mydoc
```

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted` \LaTeX package is needed. This package is included by running `doconce format` with the `-DMINTED` option:

Terminal

```
Terminal> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option:

Terminal

```
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

3.4 Plain ASCII Text

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

Terminal

```
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
```

3.5 reStructuredText

Going from Doconce to `reStructuredText` gives a lot of possibilities to go to other formats. First we filter the Doconce text to a `reStructuredText` file `mydoc.rst`:

Terminal

```
Terminal> doconce format rst mydoc.do.txt
```

We may now produce various other formats:

Terminal

```
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. However, it is more convenient to use the program `unoconv` to convert between the many formats OpenOffice supports *on the command line*. Run

Terminal

```
Terminal> unoconv --show
```

to see all the formats that are supported. For example, the following commands take `mydoc.odt` to Microsoft Office Open XML format, classic MS Word format, and PDF:

Terminal

```
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
```

Remark about Mathematical Typesetting. At the time of this writing, there is no easy way to go from Doconce and \LaTeX mathematics to reST and further to OpenOffice and the "MS Word world". Mathematics is only fully supported by `latex` as output and to a wide extent also supported by the `sphinx` output format. Some links for going from \LaTeX to Word are listed below.

- <http://ubuntuforums.org/showthread.php?t=1033441>
- <http://tug.org/utilities/texconv/textopc.html>
- <http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>

3.6 Sphinx

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the `doconce sphinx_dir` command:

Terminal

```
Terminal> doconce sphinx_dir author="authors' names" \
           title="some title" version=1.0 dirname=sphinxdir \
           theme=mytheme file1 file2 file3 ...
```

The keywords `author`, `title`, and `version` are used in the headings of the Sphinx document. By default, `version` is 1.0 and the script will try to deduce authors and title from the doconce files `file1`, `file2`, etc. that together represent the whole document. Note that none of the individual Doconce files `file1`, `file2`, etc. should include the rest as their union makes up the whole document. The default value of `dirname` is `sphinx-rootdir`. The `theme` keyword is used to set the theme for design of HTML output from Sphinx (the default theme is `'default'`).

With a single-file document in `mydoc.do.txt` one often just runs

Terminal

```
Terminal> doconce sphinx_dir mydoc
```

and then an appropriate Sphinx directory `sphinx-rootdir` is made with relevant files.

The `doconce sphinx_dir` command generates a script `automake-sphinx.py` for compiling the Sphinx document into an HTML document. One can either run `automake-sphinx.py` or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The `doconce sphinx_dir` script copies directories named `figs` or `figures` over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `automake-sphinx.py` must be edited accordingly. Links to local files (not `http:` or `file:` URLs) must be placed in the `_static` subdirectory of the Sphinx directory. The utility `doconce sphinxfix_localURLs` is run to check for local links: for each such link, say `dir1/dir2/myfile.txt` it replaces the link by `_static/myfile.txt` and copies `dir1/dir2/myfile.txt` to a local `_static` directory (in the same directory as the script is run). The user must copy all `_static/*` files to the `_static` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `_static` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `_static` directory and link to these directly from the Doconce document - then links to not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `conf.py` configuration file for Sphinx is edited accordingly, and a script `make-themes.sh` can make HTML documents with one or more themes. For example, to realize the themes `fenics` and `pyramid`, one writes

Terminal

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are `_build/html_fenics` and `_build/html_pyramid`, respectively. Without arguments, `make-themes.sh` makes

all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file `mydoc.do.txt`.

Step 1. Translate Doconce into the Sphinx format:

Terminal

```
Terminal> doconce format sphinx mydoc
```

Step 2. Create a Sphinx root directory either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

Terminal

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
y
n
n
n
n
y
n
n
y
y
y
EOF
```

The autogenerated `conf.py` file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The `doconce sphinx_dir` generator makes an extended `conv.py` file where, among other things, several useful Sphinx extensions are included.

Step 3. Copy the `mydoc.rst` file to the Sphinx root directory:

Terminal

```
Terminal> cp mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directories to `sphinx-rootdir`. Links to local files in `mydoc.rst` must be modified to links to files in the `_static` directory, see comment above.

Step 4. Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes

```
.. toctree::
   :maxdepth: 2

   mydoc
```

(The spaces before `mydoc` are important!)

Step 5. Generate, for instance, an HTML version of the Sphinx source:

Terminal

```
make clean # remove old versions
make html
```

Sphinx can generate a range of different formats: standalone HTML, HTML in separate directories with `index.html` files, a large single HTML file, JSON files, various help files (the `qthelp`, `HTML`, and `Devhelp` projects), `epub`, \LaTeX , PDF (via \LaTeX), pure text, man pages, and Texinfo files.

Step 6. View the result:

Terminal

```
Terminal> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `bcl`: `cod` gives Python (`code-block:: python` in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and \LaTeX output.

3.7 Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by

Terminal

```
Terminal> doconce format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce` format and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

3.8 Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to \LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

3.9 Demos

The current text is generated from a Doconce format stored in the file

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

3.10 Dependencies and Installation

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial (`hg`) source follows the standard procedure:

Terminal

```
# Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
```

```
sudo python setup.py install
cd ..
```

If you make use of the [Preprocess](#) preprocessor, this program must be installed:

Terminal

```
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
```

A much more advanced alternative to Preprocess is [Mako](#). Its installation is most conveniently done by pip,

Terminal

```
pip install Mako
```

This command requires pip to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by

Terminal

```
sudo apt-get install python-pip
```

Alternatively, one can install from the pip [source code](#).

To make \LaTeX documents (without going through the reStructuredText format) you need [ptex2tex](#), which is installed by

Terminal

```
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
```

As seen, `cp2texmf.sh` copies some special stylefiles that that `ptex2tex` potentially makes use of. Some more standard stylefiles are also needed. These are installed by

Terminal

```
sudo apt-get install texlive-latex-extra
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the `~/texmf/tex/latex/misc` directory).

The *minted* \LaTeX style is offered by `ptex2tex` and popular among users. This style requires the package [Pygments](#):

Terminal

```
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
```

If you use the minted style, you have to enable it by running `ptex2tex -DMINTED` and then `latex -shell-escape`, see the Section 3.

For `rst` output and further transformation to \LaTeX , HTML, XML, OpenOffice, and so on, one needs [docutils](#). The installation can be done by

Terminal

```
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..
```

To use the OpenOffice suite you will typically on Debian systems install

Terminal

```
sudo apt-get install unovonv libreoffice libreoffice-dmaths
```

There is a possibility to create PDF files from reST documents using ReportLab instead of \LaTeX . The enabling software is [rst2pdf](#). Either download the tarball or clone the svn repository, go to the `rst2pdf` directory and run `sudo python setup.py install`.

Output to sphinx requires of course [Sphinx](#), installed by

Terminal

```
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
```

When the output format is epydoc one needs that program too, installed by

Terminal

```
svn co https://epydoc.svn.sourceforge.net/svnroot/epydoc/trunk/epydoc epydoc
cd epydoc
sudo make install
cd ..
```

Finally, translation to pandoc requires the [Pandoc](#) program (written in Haskell) to be installed.

Terminal

```
sudo apt-get install pandoc
```

Remark. Several of the packages above installed from source code are also available in Debian-based system through the `apt-get install` command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For `svn` directories, go to the directory, run `svn update`, and then `sudo python setup.py install`. For Mercurial (`hg`) directories, go to the directory, run `hg pull; hg update`, and then `sudo python setup.py install`. Doconce itself is frequently updated so these commands should be run regularly.

Doconce: Document Once, Include Anywhere

Author: Hans Petter Langtangen

Date: Feb 27, 2012

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like [LaTeX](#), [HTML](#), [reStructuredText](#), [Sphinx](#), and [wiki](#)? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

The Doconce Concept

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via `rst2*` programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via `unoconv`) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.
2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: “Write once, include anywhere”.

Here are some Doconce features:

- Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than LaTeX and HTML.
- Doconce can be converted to plain *untagged* text, often desirable for computer programs and email.
- Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- Doconce has full support for LaTeX math, and integrates very well with big LaTeX projects (books).
- Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.

What Does Doconce Look Like?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- Bullet lists arise from lines starting with an asterisk.
- *Emphasized words* are surrounded by asterisks.
- **Words in boldface** are surrounded by underscores.
- Words from computer code are enclosed in back quotes and then typeset `verbatim` (in a monospace font).
- Section headings are recognized by equality (=) signs before and after the title, and the number of = signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- Paragraph headings are recognized by a double underscore before and after the heading.
- The abstract of a document starts with *Abstract* as paragraph heading, and all text up to the next heading makes up the abstract,
- Blocks of computer code can easily be included by placing `!bc` (begin code) and `!ec` (end code) commands at separate lines before and after the code block.
- Blocks of computer code can also be imported from source files.
- Blocks of LaTeX mathematics can easily be included by placing `!bt` (begin TeX) and `!et` (end TeX) commands at separate lines before and after the math block.
- There is support for both LaTeX and text-like inline mathematics.
- Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- Invisible comments in the output format can be inserted throughout the text (# at the beginning of a line).
- Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- There is special support for advanced exercises features.
- With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- ```
* item 1
* item 2
```

\* item 3

Lists can also have automatically numbered items instead of bullets,

o item 1  
o item 2  
o item 3

URLs with a link word are possible, as in "hpl":"http://folk.uio.no/hpl". If the word is URL, the URL itself becomes the link name, as in "URL":"tutorial.do.txt".

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to Section ref{my:first:sec}.

Doconce also allows inline comments such as [hpl: here I will make some remarks to the text] for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Section ref{doconce2formats} for an example).

Tables are also supported, e.g.,

| -----                 |          |              |
|-----------------------|----------|--------------|
| time                  | velocity | acceleration |
| ---r-----r-----r----- |          |              |
| 0.0                   | 1.4186   | -5.01        |
| 2.0                   | 1.376512 | 11.919       |
| 4.0                   | 1.1E+1   | 14.717624    |
| -----                 |          |              |

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

## A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and computer words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an o (for ordered) instead of the asterisk:

1. item 1
2. item 2

### 3. item 3

URLs with a link word are possible, as in [hpl](#). If the word is URL, the URL itself becomes the link name, as in [tutorial.do.txt](#).

References to sections may use logical names as labels (e.g., a “label” command right after the section title), as in the reference to the section [A Subsection with Sample Text](#).

Doconce also allows inline comments such as (**hpl**: here I will make some remarks to the text) for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section [From Doconce to Other Formats](#) for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

## Mathematics and Computer Code

Inline mathematics, such as  $v = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $v = \sin(x)$  is typeset as:

$\nu = \sin(x)$  |  $v = \sin(x)$

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (begin tex / end tex) instructions. The result looks like this:

```
\begin{eqnarray}
\{\partial u \over \partial t\} \&=& \nabla^2 u + f, \text{label{myeq1}} \\
\{\partial v \over \partial t\} \&=& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
```

Of course, such blocks only look nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like:

```
from math import sin, pi
def myfunc(x):
 return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to `sphinx`, `rst`, and `ASCII-close` formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `ptex2tex` and defined in a configuration file `.ptex2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), `pl` (Perl), `m` (Matlab), `sh` (Unix shells), `cy` (Cython), and `py` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

## Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `doc/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

## From Doconce to Other Formats

Transformation of a Doconce document `mydoc.do.txt` to various other formats applies the script `doconce format`:

```
Terminal> doconce format format mydoc.do.txt
```

or just:

```
Terminal> doconce format format mydoc
```

The `mako` or `preprocess` programs are always used to preprocess the file first, and options to `mako` or `preprocess` can be added after the filename. For example:

```
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5 # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5 # mako
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `latex`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "latex"`.

Inline comments in the text are removed from the output by:

```
Terminal> doconce format latex mydoc --skip_inline_comments
```

One can also remove all such comments from the original Doconce file by running:

```
Terminal> doconce remove_inline_comments mydoc
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

## HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by:

```
Terminal> doconce format html mydoc
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## Pandoc

Output in the versatile Pandoc format results from:

```
Terminal> doconce format pandoc mydoc
```

The name of the output file is `mydoc.pnd`. From this format one can go to numerous other formats:

```
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
```

Pandoc supports `latex`, `html`, `odt` (OpenOffice), `docx` (Microsoft Word), `rtf`, `texinfo`, to mention some. The `-R` option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the [Pandoc documentation](#) for the many features of the pandoc program.

## LaTeX

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps: ..

Note: putting code blocks inside a list is not successful in many

**Step 1. Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:**

```
Terminal> doconce format latex mydoc
```

LaTeX-specific commands (“newcommands”) in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section [Macros \(Newcommands\)](#), [Cross-References](#), [Index](#), and [Bibliography](#)). If these files are present, they are included in the LaTeX document so that your commands are defined.

**Step 2.** Run `ptex2tex` (if you have it) to make a standard LaTeX file:

```
Terminal> ptex2tex mydoc
```

or just perform a plain copy:

```
Terminal> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run:

```
Terminal> ptex2tex -DHELIVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX “maketitle” heading is also available through:

```
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
```

A separate titlepage can be generate by:

```
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

**Step 3.** Compile `mydoc.tex` and create the PDF file:

```
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex mydoc
Terminal> dvipdf mydoc
```

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted` LaTeX package is needed. This package is included by running `doconce format` with the `-DMINTED` option:



```
Terminal> ptex2tex -DMINTED mydoc
```

In this case, latex must be run with the `-shell-escape` option:

```
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from latex without the `-shell-escape` option.

## Plain ASCII Text

We can go from Doconce “back to” plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
```

## reStructuredText

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file `mydoc.rst`:

```
Terminal> doconce format rst mydoc.do.txt
```

We may now produce various other formats:

```
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. However, it is more convenient to use the program `unoconv` to convert between the many formats OpenOffice supports *on the command line*. Run:

```
Terminal> unoconv --show
```

to see all the formats that are supported. For example, the following commands take `mydoc.odt` to Microsoft Office Open XML format, classic MS Word format, and PDF:

```
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
```

*Remark about Mathematical Typesetting.* At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the “MS Word world”. Mathematics is only fully supported by latex as output and to a wide extent also supported by the sphinx output format. Some links for going from LaTeX to Word are listed below.

- <http://ubuntuforums.org/showthread.php?t=1033441>
- <http://tug.org/utilities/texconv/textopc.html>
- <http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>

## Sphinx

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the `doconce sphinx_dir` command:

```
Terminal> doconce sphinx_dir author="authors' names" \
 title="some title" version=1.0 dirname=sphinx_dir \
 theme=mytheme file1 file2 file3 ...
```

The keywords `author`, `title`, and `version` are used in the headings of the Sphinx document. By default, `version` is 1.0 and the script will try to deduce authors and title from the doconce files `file1`, `file2`, etc. that together represent the whole document. Note that none of the individual Doconce files `file1`, `file2`, etc. should include the rest as their union makes up the whole document. The default value of `dirname` is `sphinx-rootdir`. The `theme` keyword is used to set the theme for design of HTML output from Sphinx (the default theme is 'default').

With a single-file document in `mydoc.do.txt` one often just runs:

```
Terminal> doconce sphinx_dir mydoc
```

and then an appropriate Sphinx directory `sphinx-rootdir` is made with relevant files.

The `doconce sphinx_dir` command generates a script `automake-sphinx.py` for compiling the Sphinx document into an HTML document. One can either run `automake-sphinx.py` or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The `doconce sphinx_dir` script copies directories named `figs` or `figures` over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `automake-sphinx.py` must be edited accordingly. Links to local files (not `http:` or `file:` URLs) must be placed in the `_static` subdirectory of the Sphinx directory. The utility `doconce sphinxfix_localURLs` is run to check for local links: for each such link, say `dir1/dir2/myfile.txt` it replaces the link by `_static/myfile.txt` and copies `dir1/dir2/myfile.txt` to a local `_static` directory (in the same directory as the script is run). The user must copy all `_static/*` files to the `_static` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `_static` subdirectory of the Sphinx directory. It may be wise

to place relevant files in a `_static` directory and link to these directly from the Doconce document - then links to not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `conf.py` configuration file for Sphinx is edited accordingly, and a script `make-themes.sh` can make HTML documents with one or more themes. For example, to realize the themes `fenics` and `pyramid`, one writes:

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are `_build/html_fenics` and `_build/html_pyramid`, respectively. Without arguments, `make-themes.sh` makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file `mydoc.do.txt`.

*Step 1.* Translate Doconce into the Sphinx format:

```
Terminal> doconce format sphinx mydoc
```

*Step 2.* Create a Sphinx root directory either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
n
Y
n
n
Y
Y
Y
EOF
```

The autogenerated `conf.py` file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The `doconce sphinx_dir` generator makes an extended `conv.py` file where, among other things, several useful Sphinx extensions are included.

*Step 3.* Copy the `mydoc.rst` file to the Sphinx root directory:

```
Terminal> cp mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directories to `sphinx-rootdir`. Links to local files in `mydoc.rst` must be modified to links to files in the `_static` directory, see comment above.

*Step 4.* Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes:

```
.. toctree::
 :maxdepth: 2

 mydoc
```

(The spaces before `mydoc` are important!)

*Step 5.* Generate, for instance, an HTML version of the Sphinx source:

```
make clean # remove old versions
make html
```

Sphinx can generate a range of different formats: standalone HTML, HTML in separate directories with `index.html` files, a large single HTML file, JSON files, various help files (the `qthelp`, `HTML`, and `Devhelp` projects), `epub`, `LaTeX`, `PDF` (via `LaTeX`), pure text, man pages, and `Texinfo` files.

*Step 6.* View the result:

```
Terminal> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `!bc`: `cod` gives Python (code-block:: python in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and `LaTeX` output.

## Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by:

```
Terminal> doconce format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

## Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

## Demos

The current text is generated from a Doconce format stored in the file:

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

## Dependencies and Installation

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial (hg) source follows the standard procedure:

```
Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
cd ..
```

If you make use of the [Preprocess](#) preprocessor, this program must be installed:

```
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
```

A much more advanced alternative to Preprocess is [Mako](#). Its installation is most conveniently done by `pip`:

```
pip install Mako
```

This command requires `pip` to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by:

```
sudo apt-get install python-pip
```

Alternatively, one can install from the [pip source code](#).

To make LaTeX documents (without going through the reStructuredText format) you need [ptex2tex](#), which is installed by:

```
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
```

As seen, `cp2texmf.sh` copies some special stylefiles that that `ptex2tex` potentially makes use of. Some more standard stylefiles are also needed. These are installed by:

```
sudo apt-get install texlive-latex-extra
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the `~/texmf/tex/latex/misc` directory).

The *minted* LaTeX style is offered by `ptex2tex` and popular among users. This style requires the package [Pygments](#):

```
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
```

If you use the minted style, you have to enable it by running `ptex2tex -DMINTED` and then `latex -shell-escape`, see the the section [From Doconce to Other Formats](#).

For `rst` output and further transformation to LaTeX, HTML, XML, OpenOffice, and so on, one needs [docutils](#). The installation can be done by:

```
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..
```

To use the OpenOffice suite you will typically on Debian systems install:

```
sudo apt-get install unovonv libreoffice libreoffice-dmaths
```

There is a possibility to create PDF files from reST documents using ReportLab instead of LaTeX. The enabling software is [rst2pdf](#). Either download the tarball or clone the svn repository, go to the `rst2pdf` directory and run `sudo python setup.py install`.

**system-message**

**WARNING/2** in tutorial.rst, line 399  
Duplicate explicit target name: “sphinx”.

Output to sphinx requires of course [Sphinx](#), installed by:

```
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
```

When the output format is epydoc one needs that program too, installed by:

```
svn co https://epydoc.svn.sourceforge.net/svnroot/epydoc/trunk/epydoc epydoc
cd epydoc
sudo make install
cd ..
```

Finally, translation to pandoc requires the [Pandoc](#) program (written in Haskell) to be installed:

```
sudo apt-get install pandoc
```

*Remark.* Several of the packages above installed from source code are also available in Debian-based system through the `apt-get install` command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For `svn` directories, go to the directory, run `svn update`, and then `sudo python setup.py install`. For Mercurial (`hg`) directories, go to the directory, run `hg pull; hg update`, and then `sudo python setup.py install`. Doconce itself is frequently updated so these commands should be run regularly.

---

# **Doconce: Document Once, Include Anywhere Documentation**

***Release 1.0***

**Hans Petter Langtangen**

February 27, 2012





# CONTENTS

|          |                                                                           |           |
|----------|---------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>Doconce: Document Once, Include Anywhere</b>                           | <b>3</b>  |
| <b>2</b> | <b>The Doconce Concept</b>                                                | <b>5</b>  |
| <b>3</b> | <b>What Does Doconce Look Like?</b>                                       | <b>7</b>  |
| 3.1      | A Subsection with Sample Text . . . . .                                   | 8         |
| 3.2      | Mathematics and Computer Code . . . . .                                   | 9         |
| 3.3      | Macros (Newcommands), Cross-References, Index, and Bibliography . . . . . | 10        |
| <b>4</b> | <b>From Doconce to Other Formats</b>                                      | <b>11</b> |
| 4.1      | HTML . . . . .                                                            | 11        |
| 4.2      | Pandoc . . . . .                                                          | 11        |
| 4.3      | LaTeX . . . . .                                                           | 12        |
| 4.4      | Plain ASCII Text . . . . .                                                | 13        |
| 4.5      | reStructuredText . . . . .                                                | 13        |
| 4.6      | Sphinx . . . . .                                                          | 14        |
| 4.7      | Google Code Wiki . . . . .                                                | 16        |
| 4.8      | Tweaking the Doconce Output . . . . .                                     | 16        |
| 4.9      | Demos . . . . .                                                           | 16        |
| 4.10     | Dependencies and Installation . . . . .                                   | 17        |
| <b>5</b> | <b>Indices and tables</b>                                                 | <b>19</b> |



Contents:



# DOCONCE: DOCUMENT ONCE, INCLUDE ANYWHERE

**Author** Hans Petter Langtangen

**Date** Feb 27, 2012

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like LaTeX, HTML, reStructuredText, Sphinx, and wiki? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.



---

# THE DOCONCE CONCEPT

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via `rst2*` programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via `unoconv`) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.
2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: “Write once, include anywhere”.

Here are some Doconce features:

- Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than LaTeX and HTML.
- Doconce can be converted to plain *untagged* text, often desirable for computer programs and email.
- Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- Doconce has full support for LaTeX math, and integrates very well with big LaTeX projects (books).
- Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.



History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.

# WHAT DOES DOCONCE LOOK LIKE?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- Bullet lists arise from lines starting with an asterisk.
- *Emphasized words* are surrounded by asterisks.
- **Words in boldface** are surrounded by underscores.
- Words from computer code are enclosed in back quotes and then typeset `verbatim` (in a monospace font).
- Section headings are recognized by equality (=) signs before and after the title, and the number of = signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- Paragraph headings are recognized by a double underscore before and after the heading.
- The abstract of a document starts with *Abstract* as paragraph heading, and all text up to the next heading makes up the abstract,
- Blocks of computer code can easily be included by placing `!bc` (begin code) and `!ec` (end code) commands at separate lines before and after the code block.
- Blocks of computer code can also be imported from source files.
- Blocks of LaTeX mathematics can easily be included by placing `!bt` (begin TeX) and `!et` (end TeX) commands at separate lines before and after the math block.
- There is support for both LaTeX and text-like inline mathematics.
- Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- Invisible comments in the output format can be inserted throughout the text (# at the beginning of a line).
- Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- There is special support for advanced exercises features.
- With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `"hpl":"http://folk.uio.no/hpl"`. If the word is URL, the URL itself becomes the link name, as in `"URL":"tutorial.do.txt"`.

References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to `Section ref{my:first:sec}`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Section ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

```
|-----|
|time | velocity | acceleration |
|---r---r-----r-----|
| 0.0 | 1.4186 | -5.01 |
| 2.0 | 1.376512 | 11.919 |
| 4.0 | 1.1E+1 | 14.717624 |
|-----|
```

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

### 3.1 A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and `computer` words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in [hpl](#). If the word is URL, the URL itself becomes the link name, as in [tutorial.do.txt](#).

References to sections may use logical names as labels (e.g., a “label” command right after the section title), as in the reference to the section [A Subsection with Sample Text](#).

Doconce also allows inline comments such as (**hpl**: here I will make some remarks to the text) for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section [From Doconce to Other Formats](#) for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

## 3.2 Mathematics and Computer Code

Inline mathematics, such as  $\nu = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $\nu = \sin(x)$  is typeset as

`$\nu = \sin(x)$` | `$v = \sin(x)$`

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (begin tex / end tex) instructions. The result looks like this:

$$\begin{aligned}\frac{\partial u}{\partial t} &= \nabla^2 u + f, \\ \frac{\partial v}{\partial t} &= \nabla \cdot (q(u) \nabla v) + g\end{aligned}\tag{3.1}$$

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like

```
from math import sin, pi
def myfunc(x):
 return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to `sphinx`, `rst`, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `ptex2tex` and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), `pl` (Perl), `m` (Matlab), `sh` (Unix shells), `cy` (Cython), and `py` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

### 3.3 Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `doc/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

# FROM DOCONCE TO OTHER FORMATS

Transformation of a Doconce document `mydoc.do.txt` to various other formats applies the script `doconce` format:

```
Terminal> doconce format format mydoc.do.txt
```

or just

```
Terminal> doconce format format mydoc
```

The `mako` or `preprocess` programs are always used to preprocess the file first, and options to `mako` or `preprocess` can be added after the filename. For example,

```
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5 # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5 # mako
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `latex`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "latex"`.

Inline comments in the text are removed from the output by

```
Terminal> doconce format latex mydoc --skip_inline_comments
```

One can also remove all such comments from the original Doconce file by running:

```
Terminal> doconce remove_inline_comments mydoc
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

## 4.1 HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by

```
Terminal> doconce format html mydoc
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## 4.2 Pandoc

Output in the versatile Pandoc format results from

```
Terminal> doconce format pandoc mydoc
```

The name of the output file is `mydoc.pnd`. From this format one can go to numerous other formats:

```
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
```

Pandoc supports latex, html, odt (OpenOffice), docx (Microsoft Word), rtf, texinfo, to mention some. The `-R` option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the [Pandoc documentation](#) for the many features of the pandoc program.

## 4.3 LaTeX

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps: .. Note: putting code blocks inside a list is not successful in many

**Step 1. Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:**

```
Terminal> doconce format latex mydoc
```

LaTeX-specific commands (“newcommands”) in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section [Macros \(Newcommands\), Cross-References, Index, and Bibliography](#)). If these files are present, they are included in the LaTeX document so that your commands are defined.

**Step 2. Run `ptex2tex` (if you have it) to make a standard LaTeX file,**

```
Terminal> ptex2tex mydoc
```

or just perform a plain copy,

```
Terminal> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run

```
Terminal> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX “maketitle” heading is also available through

```
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
```

A separate titlepage can be generate by

```
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

**Step 3. Compile `mydoc.tex` and create the PDF file:**

```
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
```

```
Terminal> latex mydoc
Terminal> dvipdf mydoc
```

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted` LaTeX package is needed. This package is included by running `doconce format` with the `-DMINTED` option:

```
Terminal> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option:

```
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

## 4.4 Plain ASCII Text

We can go from Doconce “back to” plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
```

## 4.5 reStructuredText

Going from Doconce to `reStructuredText` gives a lot of possibilities to go to other formats. First we filter the Doconce text to a `reStructuredText` file `mydoc.rst`:

```
Terminal> doconce format rst mydoc.do.txt
```

We may now produce various other formats:

```
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. However, it is more convenient to use the program `unoconv` to convert between the many formats OpenOffice supports *on the command line*. Run

```
Terminal> unoconv --show
```

to see all the formats that are supported. For example, the following commands take `mydoc.odt` to Microsoft Office Open XML format, classic MS Word format, and PDF:

```
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
```



*Remark about Mathematical Typesetting.* At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the “MS Word world”. Mathematics is only fully supported by latex as output and to a wide extent also supported by the sphinx output format. Some links for going from LaTeX to Word are listed below.

- <http://ubuntuforums.org/showthread.php?t=1033441>
- <http://tug.org/utilities/texconv/textopc.html>
- <http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>

## 4.6 Sphinx

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the `doconce sphinx_dir` command:

```
Terminal> doconce sphinx_dir author="authors' names" \
 title="some title" version=1.0 dirname=sphinx_dir \
 theme=mytheme file1 file2 file3 ...
```

The keywords `author`, `title`, and `version` are used in the headings of the Sphinx document. By default, `version` is 1.0 and the script will try to deduce authors and title from the doconce files `file1`, `file2`, etc. that together represent the whole document. Note that none of the individual Doconce files `file1`, `file2`, etc. should include the rest as their union makes up the whole document. The default value of `dirname` is `sphinx-rootdir`. The theme keyword is used to set the theme for design of HTML output from Sphinx (the default theme is ‘default’).

With a single-file document in `mydoc.do.txt` one often just runs

```
Terminal> doconce sphinx_dir mydoc
```

and then an appropriate Sphinx directory `sphinx-rootdir` is made with relevant files.

The `doconce sphinx_dir` command generates a script `automake-sphinx.py` for compiling the Sphinx document into an HTML document. One can either run `automake-sphinx.py` or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The `doconce sphinx_dir` script copies directories named `figs` or `figures` over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `automake-sphinx.py` must be edited accordingly. Links to local files (not `http:` or `file:` URLs) must be placed in the `_static` subdirectory of the Sphinx directory. The utility `doconce sphinxfix_localURLs` is run to check for local links: for each such link, say `dir1/dir2/myfile.txt` it replaces the link by `_static/myfile.txt` and copies `dir1/dir2/myfile.txt` to a local `_static` directory (in the same directory as the script is run). The user must copy all `_static/*` files to the `_static` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `_static` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `_static` directory and link to these directly from the Doconce document - then links to not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `conf.py` configuration file for Sphinx is edited accordingly, and a script `make-themes.sh` can make HTML documents with one or more themes. For example, to realize the themes `fenics` and `pyramid`, one writes

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are `_build/html_fenics` and `_build/html_pyramid`, respectively. Without arguments, `make-themes.sh` makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file `mydoc.do.txt`.

*Step 1.* Translate Doconce into the Sphinx format:

```
Terminal> doconce format sphinx mydoc
```

*Step 2.* Create a Sphinx root directory either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
Y
EOF
```

The autogenerated `conf.py` file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The `doconce sphinx_dir` generator makes an extended `conf.py` file where, among other things, several useful Sphinx extensions are included.

*Step 3.* Copy the `mydoc.rst` file to the Sphinx root directory:

```
Terminal> cp mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directories to `sphinx-rootdir`. Links to local files in `mydoc.rst` must be modified to links to files in the `_static` directory, see comment above.

*Step 4.* Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes

```
.. toctree::
 :maxdepth: 2

 mydoc
```

(The spaces before `mydoc` are important!)

*Step 5.* Generate, for instance, an HTML version of the Sphinx source:

```
make clean # remove old versions
make html
```

Sphinx can generate a range of different formats: standalone HTML, HTML in separate directories with `index.html` files, a large single HTML file, JSON files, various help files (the `qthelp`, `HTML`, and `Devhelp` projects), `epub`, `LaTeX`, `PDF` (via `LaTeX`), `pure text`, `man pages`, and `Texinfo` files.

*Step 6.* View the result:

```
Terminal> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `!bc`: `cod` gives Python (`code-block:: python` in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

## 4.7 Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by

```
Terminal> doconce format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

## 4.8 Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

## 4.9 Demos

The current text is generated from a Doconce format stored in the file

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

## 4.10 Dependencies and Installation

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial (hg) source follows the standard procedure:

```
Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
cd ..
```

If you make use of the [Preprocess](#) preprocessor, this program must be installed:

```
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
```

A much more advanced alternative to Preprocess is [Mako](#). Its installation is most conveniently done by pip,

```
pip install Mako
```

This command requires pip to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by

```
sudo apt-get install python-pip
```

Alternatively, one can install from the [pip source code](#).

To make LaTeX documents (without going through the reStructuredText format) you need [ptex2tex](#), which is installed by

```
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
```

As seen, `cp2texmf.sh` copies some special stylefiles that that `ptex2tex` potentially makes use of. Some more standard stylefiles are also needed. These are installed by

```
sudo apt-get install texlive-latex-extra
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the `~/texmf/tex/latex/misc` directory).

The *minted* LaTeX style is offered by `ptex2tex` and popular among users. This style requires the package [Pygments](#):

```
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
```

If you use the *minted* style, you have to enable it by running `ptex2tex -DMINTED` and then `latex -shell-escape`, see the the section [From Doconce to Other Formats](#).

For `rst` output and further transformation to LaTeX, HTML, XML, OpenOffice, and so on, one needs [docutils](#). The installation can be done by

```
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..
```

To use the OpenOffice suite you will typically on Debian systems install

```
sudo apt-get install unovonv libreoffice libreoffice-dmaths
```

There is a possibility to create PDF files from reST documents using ReportLab instead of LaTeX. The enabling software is [rst2pdf](#). Either download the tarball or clone the svn repository, go to the `rst2pdf` directory and run `sudo python setup.py install`.

Output to sphinx requires of course [Sphinx](#), installed by

```
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
```

When the output format is epydoc one needs that program too, installed by

```
svn co https://epydock.svn.sourceforge.net/svnroot/epydock/trunk/epydock epydoc
cd epydoc
sudo make install
cd ..
```

Finally, translation to pandoc requires the [Pandoc](#) program (written in Haskell) to be installed.

```
sudo apt-get install pandoc
```

*Remark.* Several of the packages above installed from source code are also available in Debian-based system through the `apt-get install` command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For `svn` directories, go to the directory, run `svn update`, and then `sudo python setup.py install`. For Mercurial (`hg`) directories, go to the directory, run `hg pull`; `hg update`, and then `sudo python setup.py install`. Doconce itself is frequently updated so these commands should be run regularly.

# INDICES AND TABLES

- *genindex*
- *modindex*
- *search*

## tutorial.txt

Doconce: Document Once, Include Anywhere  
=====

Hans Petter Langtangen [1, 2]

[1] Simula Research Laboratory  
[2] University of Oslo

Date: Feb 27, 2012

- \* When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- \* Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like LaTeX (<http://refcards.com/docs/silvermanj/amslatex/LaTeXRefCard.v2.0.pdf>), HTML (<http://www.htmlcodetutorial.com/>), reStructuredText (<http://docutils.sourceforge.net/docs/ref/rst/restructuredtext.html>), Sphinx (<http://sphinx.pocoo.org/contents.html>), and wiki (<http://code.google.com/p/support/wiki/WikiSyntax>)? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- \* Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

The Doconce Concept  
=====

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via rst2\* programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via unoconv) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.
2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.).

**tutorial.txt**

The Doconce markup language support this working strategy.  
The slogan is: "Write once, include anywhere".

Here are some Doconce features:

- \* Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than LaTeX and HTML.
- \* Doconce can be converted to plain *\*untagged\** text, often desirable for computer programs and email.
- \* Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- \* Doconce has full support for LaTeX math, and integrates very well with big LaTeX projects (books).
- \* Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- \* Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- \* Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- \* Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.
- \* Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.



” **tutorial.txt** ”

## What Does Doconce Look Like?

=====

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- \* Bullet lists arise from lines starting with an asterisk.
- \* *\*Emphasized words\** are surrounded by asterisks.
- \* Words in boldface are surrounded by underscores.
- \* Words from computer code are enclosed in back quotes and then typeset verbatim (in a monospace font).
- \* Section headings are recognized by equality (=) signs before and after the title, and the number of = signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- \* Paragraph headings are recognized by a double underscore before and after the heading.
- \* The abstract of a document starts with *\*Abstract\** as paragraph heading, and all text up to the next heading makes up the abstract,
- \* Blocks of computer code can easily be included by placing `!bc` (begin code) and `!ec` (end code) commands at separate lines before and after the code block.
- \* Blocks of computer code can also be imported from source files.
- \* Blocks of LaTeX mathematics can easily be included by placing `!bt` (begin TeX) and `!et` (end TeX) commands at separate lines before and after the math block.
- \* There is support for both LaTeX and text-like inline mathematics.
- \* Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- \* Invisible comments in the output format can be inserted throughout the text (`#` at the beginning of a line).
- \* Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- \* There is special support for advanced exercises features.
- \* With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- \* With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

” **tutorial.txt** ”

Here is an example of some simple text written in the Doconce format::

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for \_boldface\_ words, *\*emphasized\** words, and 'computer' words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in "hpl":"http://folk.uio.no/hpl"

If the word is URL, the URL itself becomes the link name, as in "URL":"tutorial.do.txt".

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to Section ref{my:first:sec}.

Doconce also allows inline comments such as [hpl: here I will make some remarks to the text] for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Section ref{doconce2formats} for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for \_boldface\_ words, *\*emphasized\** words, and computer words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2

” **tutorial.txt** ”

\* item 3

Lists can also have numbered items instead of bullets, just use an o (for ordered) instead of the asterisk:

1. item 1

2. item 2

3. item 3

URLs with a link word are possible, as in hpl (<http://folk.uio.no/hpl>). If the word is URL, the URL itself becomes the link name, as in tutorial.do.txt.

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to the section "A Subsection with Sample Text".

Doconce also allows inline comments such as [hpl: here I will make some remarks to the text] for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section "From Doconce to Other Formats" for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

## Mathematics and Computer Code

Inline mathematics, such as  $v = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $v = \sin(x)$  is typeset as::

$$\nu = \sin(x) \quad | \quad v = \sin(x)$$

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside !bt and !et (begin tex / end tex) instructions.

The result looks like this::

```
\begin{eqnarray}
\{\partial u \over \partial t\} \&\& \nabla^2 u + f, \text{label}\{myeq1\} \\
\{\partial v \over \partial t\} \&\& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
```

” **tutorial.txt** ”

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like::

```
from math import sin, pi
def myfunc(x):
 return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to sphinx, rst, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `ptex2tex` and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments)::

```
sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), `pl` (Perl), `m` (Matlab), `sh` (Unix shells), `cy` (Cython), and `py` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a sphinx code-blocks comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

Macros (Newcommands), Cross-References, Index, and Bibliography

-----

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name

” **tutorial.txt** ”

`newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `doc/manual/manual.do.txt` file (see the demo page (<https://doconce.googlecode.com/hg/doc/demos/manual/index.html>) for various formats of this document).

#### From Doconce to Other Formats =====

Transformation of a Doconce document `mydoc.do.txt` to various other formats applies the script `doconce format`:

```
Terminal> doconce format format mydoc.do.txt
```

or just::

```
Terminal> doconce format format mydoc
```

The `mako` or `preprocess` programs are always used to preprocess the file first, and options to `mako` or `preprocess` can be added after the filename. For example::

```
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5 # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5 # mako
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is

”

**tutorial.txt**

”

defined as latex. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "latex"`.

Inline comments in the text are removed from the output by::

```
Terminal> doconce format latex mydoc --skip_inline_comments
```

One can also remove all such comments from the original Doconce file by running::

```
Terminal> doconce remove_inline_comments mydoc
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

**HTML**

----

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by::

```
Terminal> doconce format html mydoc
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

**Pandoc**

-----

Output in the versatile Pandoc format results from::

```
Terminal> doconce format pandoc mydoc
```

The name of the output file is `mydoc.pnd`.  
From this format one can go to numerous other formats::

```
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
```

```
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
```

Pandoc supports latex, html, odt (OpenOffice), docx (Microsoft Word), rtf, texinfo, to mention some. The `-R` option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the Pandoc documentation (<http://johnmacfarlane.net/pandoc/README.html>) for the many features of the pandoc program.

**LaTeX**

-----

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps:

\*Step 1.\* Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`::

”

”

”

**tutorial.txt**

```
Terminal> doconce format latex mydoc
```

LaTeX-specific commands ("newcommands") in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section "Macros (Newcommands), Cross-References, Index, and Bibliography"). If these files are present, they are included in the LaTeX document so that your commands are defined.

**\*Step 2.\*** Run `ptex2tex` (if you have it) to make a standard LaTeX file::

```
Terminal> ptex2tex mydoc
```

or just perform a plain copy::

```
Terminal> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run::

```
Terminal> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX "maketitle" heading is also available through::

```
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
```

A separate titlepage can be generate by::

```
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

**\*Step 3.\*** Compile `mydoc.tex` and create the PDF file::

```
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex mydoc
Terminal> dvipdf mydoc
```

” **tutorial.txt** ”

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted` LaTeX package is needed. This package is included by running `doconce` format with the `-DMINTED` option::

```
Terminal> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option::

```
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

#### Plain ASCII Text

-----

We can go from `Doconce` "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code::

```
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
```

#### reStructuredText

-----

Going from `Doconce` to `reStructuredText` gives a lot of possibilities to go to other formats. First we filter the `Doconce` text to a `reStructuredText` file `mydoc.rst`::

```
Terminal> doconce format rst mydoc.do.txt
```

We may now produce various other formats::

```
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The `OpenOffice` file `mydoc.odt` can be loaded into `OpenOffice` and saved in, among other things, the `RTF` format or the `Microsoft Word` format. However, it is more convenient to use the program `unovonv` to convert between the many formats `OpenOffice` supports \*on the command line\*.



” **tutorial.txt** ”

Run::

```
Terminal> unoconv --show
```

to see all the formats that are supported.  
For example, the following commands take  
mydoc.odt to Microsoft Office Open XML format,  
classic MS Word format, and PDF::

```
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
```

\*Remark about Mathematical Typesetting.\* At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the "MS Word world". Mathematics is only fully supported by latex as output and to a wide extent also supported by the sphinx output format. Some links for going from LaTeX to Word are listed below.

- \* <http://ubuntuforums.org/showthread.php?t=1033441>
- \* <http://tug.org/utilities/texconv/textopc.html>
- \* <http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>

Sphinx  
-----

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the doconce sphinx\_dir command::

```
Terminal> doconce sphinx_dir author="authors' names" \
 title="some title" version=1.0 dirname=sphinx_dir \
 theme=mytheme file1 file2 file3 ...
```

The keywords author, title, and version are used in the headings of the Sphinx document. By default, version is 1.0 and the script will try to deduce authors and title from the doconce files file1, file2, etc. that together represent the whole document. Note that none of the individual Doconce files file1, file2, etc. should include the rest as their union makes up the whole document. The default value of dirname is sphinx-rootdir. The theme keyword is used to set the theme for design of HTML output from Sphinx (the default theme is 'default').

With a single-file document in mydoc.do.txt one often just runs::

```
Terminal> doconce sphinx_dir mydoc
```

and then an appropriate Sphinx directory sphinx-rootdir is made with relevant files.

The doconce sphinx\_dir command generates a script

” **tutorial.txt** ”

automake-sphinx.py for compiling the Sphinx document into an HTML document. One can either run automake-sphinx.py or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The doconce sphinx\_dir script copies directories named figs or figures over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, automake-sphinx.py must be edited accordingly. Links to local files (not http: or file: URLs) must be placed in the \_static subdirectory of the Sphinx directory. The utility doconce sphinxfix\_localURLs is run to check for local links: for each such link, say dir1/dir2/myfile.txt it replaces the link by \_static/myfile.txt and copies dir1/dir2/myfile.txt to a local \_static directory (in the same directory as the script is run). The user must copy all \_static/\* files to the \_static subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the \_static subdirectory of the Sphinx directory. It may be wise to place relevant files in a \_static directory and link to these directly from the Doconce document - then links do not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the conf.py configuration file for Sphinx is edited accordingly, and a script make-themes.sh can make HTML documents with one or more themes. For example, to realize the themes fenics and pyramid, one writes::

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are \_build/html\_fenics and \_build/html\_pyramid, respectively. Without arguments, make-themes.sh makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file mydoc.do.txt.

\*Step 1.\* Translate Doconce into the Sphinx format::

```
Terminal> doconce format sphinx mydoc
```

\*Step 2.\* Create a Sphinx root directory either manually or by using the interactive sphinx-quickstart program. Here is a scripted version of the steps with the latter::

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
```

” **tutorial.txt** ”

```

-
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
EOF

```

The autogenerated `conf.py` file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The `doconce sphinx_dir` generator makes an extended `conv.py` file where, among other things, several useful Sphinx extensions are included.

**\*Step 3.\*** Copy the `mydoc.rst` file to the Sphinx root directory::

```
Terminal> cp mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directories to `sphinx-rootdir`. Links to local files in `mydoc.rst` must be modified to links to files in the `_static` directory, see comment above.

**\*Step 4.\*** Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes::

```

.. toctree::
 :maxdepth: 2

 mydoc

```

(The spaces before `mydoc` are important!)

**\*Step 5.\*** Generate, for instance, an HTML version of the Sphinx source::

```

make clean # remove old versions
make html

```

Sphinx can generate a range of different formats:

## tutorial.txt

standalone HTML, HTML in separate directories with index.html files, a large single HTML file, JSON files, various help files (the qthelp, HTML, and Devhelp projects), epub, LaTeX, PDF (via LaTeX), pure text, man pages, and Texinfo files.

\*Step 6.\* View the result::

```
Terminal> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows !bc: cod gives Python (code-block:: python in Sphinx syntax) and cppcod gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

### Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by Google Code (<http://code.google.com/p/support/wiki/WikiSyntax>). The transformation to this format, called gwiki to explicitly mark it as the Google Code dialect, is done by::

```
Terminal> doconce format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the mydoc.gwiki output file from doconce format and paste the file contents into the wiki page. Press `_Preview_` or `_Save Page_` to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

### Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the .rst file is going to be filtered to LaTeX or HTML, it cannot know if .eps or .png is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., sed, perl, python, or scitools subst, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The make.sh files in docs/manual and docs/tutorial constitute comprehensive examples on how such scripts can be made.

### Demos

The current text is generated from a Doconce format stored in the file::

## tutorial.txt

docs/tutorial/tutorial.do.txt

The file `make.sh` in the tutorial directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. Here (<https://doconce.googlecode.com/hg/doc/demos/tutorial/index.html>) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

### Dependencies and Installation

-----

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial (hg) source follows the standard procedure::

```
Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
cd ..
```

If you make use of the Preprocess (<http://code.google.com/p/preprocess>) preprocessor, this program must be installed::

```
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
```

A much more advanced alternative to Preprocess is Mako (<http://www.makotemplates.org>). Its installation is most conveniently done by pip::

```
pip install Mako
```

This command requires pip to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by::

```
sudo apt-get install python-pip
```

Alternatively, one can install from the pip source code (<http://pypi.python.org/pypi/pip>).

To make LaTeX

” **tutorial.txt** ”

documents (without going through the reStructuredText format) you need ptex2tex (<http://code.google.com/p/ptex2tex>), which is installed by::

```
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
```

As seen, cp2texmf.sh copies some special stylefiles that that ptex2tex potentially makes use of. Some more standard stylefiles are also needed. These are installed by::

```
sudo apt-get install texlive-latex-extra
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the ~/texmf/tex/latex/misc directory).

The *\*minted\** LaTeX style is offered by ptex2tex and popular among users. This style requires the package Pygments (<http://pygments.org>)::

```
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
```

If you use the minted style, you have to enable it by running ptex2tex -DMINTED and then latex -shell-escape, see the the section "From Doconce to Other Formats".

For rst output and further transformation to LaTeX, HTML, XML, OpenOffice, and so on, one needs docutils (<http://docutils.sourceforge.net>). The installation can be done by::

```
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/
docutils
cd docutils
sudo python setup.py install
cd ..
```

To use the OpenOffice suite you will typically on Debian systems install::

```
sudo apt-get install unovonv libreoffice libreoffice-dmaths
```

There is a possibility to create PDF files from reST documents using ReportLab instead of LaTeX. The enabling software is rst2pdf (<http://code.google.com/p/rst2pdf>). Either download the tarball or clone the svn repository, go to the rst2pdf directory and run sudo python setup.py install.

”

**tutorial.txt**

”

Output to sphinx requires of course Sphinx (<http://sphinx.pocoo.org>), installed by::

```
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
```

When the output format is epydoc one needs that program too, installed by::

```
svn co https://epydoc.svn.sourceforge.net/svnroot/epydoc/trunk/epydoc epydoc
cd epydoc
sudo make install
cd ..
```

Finally, translation to pandoc requires the Pandoc (<http://johnmacfarlane.net/pandoc/>) program (written in Haskell) to be installed::

```
sudo apt-get install pandoc
```

*\*Remark.\** Several of the packages above installed from source code are also available in Debian-based system through the apt-get install command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For svn directories, go to the directory, run svn update, and then sudo python setup.py install. For Mercurial (hg) directories, go to the directory, run hg pull; hg update, and then sudo python setup.py install. Doonce itself is frequently updated so these commands should be run regularly.

## tutorial.epytext

TITLE: Doconce: Document Once, Include Anywhere  
 BY: Hans Petter Langtangen (Simula Research Laboratory, and University of Oslo)  
 ATE: today

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like U{LaTeX<<http://refcards.com/docs/silvermanj/amslatex/LaTeXRefCard.v2.0.pdf>>}, U{HTML<<http://www.htmlcodetutorial.com/>>}, U{reStructuredText<<http://docutils.sourceforge.net/docs/ref/rst/restructuredtext.html>>}, U{Sphinx<<http://sphinx.pocoo.org/contents.html>>}, and U{wiki<<http://code.google.com/p/support/wiki/WikiSyntax>>}? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

### The Doconce Concept

=====

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via C{rst2\*} programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via C{unoconv}) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.
2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: "Write once, include anywhere".

Here are some Doconce features:

- Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than LaTeX and HTML.
- Doconce can be converted to plain I{untagged} text,



## tutorial.epytext

often desirable for computer programs and email.

- Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- Doconce has full support for LaTeX math, and integrates very well with big LaTeX projects (books).
- Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.

### What Does Doconce Look Like?

=====

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- Bullet lists arise from lines starting with an asterisk.
- I{Emphasized words} are surrounded by asterisks.
- B{Words in boldface} are surrounded by underscores.
- Words from computer code are enclosed in back quotes and then typeset C{verbatim (in a monospace font)}.
- Section headings are recognized by equality (C{=}) signs before and after the title, and the number of C{=} signs indicates the level of the section: 7 for main section, 5 for subsection, and

” **tutorial.epytext** ”

3 for subsubsection.

- Paragraph headings are recognized by a double underscore before and after the heading.
- The abstract of a document starts with I{Abstract} as paragraph heading, and all text up to the next heading makes up the abstract,
- Blocks of computer code can easily be included by placing C{!bc} (begin code) and C{!ec} (end code) commands at separate lines before and after the code block.
- Blocks of computer code can also be imported from source files.
- Blocks of LaTeX mathematics can easily be included by placing C{!bt} (begin TeX) and C{!et} (end TeX) commands at separate lines before and after the math block.
- There is support for both LaTeX and text-like inline mathematics.
- Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- Invisible comments in the output format can be inserted throughout the text (C{#} at the beginning of a line).
- Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- There is special support for advanced exercises features.
- With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format::

```
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for boldface words, *\*emphasized\** words, and 'computer' words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in "hpl":"http://folk.uio.no/hpl"

If the word is URL, the URL itself becomes the link name, as in "URL":"tutorial.do.txt".

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to Section ref{my:first:sec}.

Doconce also allows inline comments such as [hpl: here I will make some remarks to the text] for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument

## tutorial.epytext

(see Section `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for `B{boldface}` words, `I{emphasized}` words, and `C{computer}` words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `C{o}` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in `U{hpl<http://folk.uio.no/hpl>}`. If the word is URL, the URL itself becomes the link name, as in `U{tutorial.do.txt<tutorial.do.txt>}`.

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to the section "A Subsection with Sample Text".

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section "From Doconce to Other Formats" for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

Mathematics and Computer Code

” **tutorial.epytext** ”

Inline mathematics, such as  $M\{v = \sin(x)\}$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $M\{v = \sin(x)\}$  is typeset as::

NOTE: A verbatim block has been removed because  
it causes problems for Epytext.

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `C{!bt}` and `C{!et}` (begin tex / end tex) instructions. The result looks like this::

NOTE: A verbatim block has been removed because  
it causes problems for Epytext.

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `C{!bc}` and `C{!ec}` instructions, respectively. Such blocks look like::

```
from math import sin, pi
def myfunc(x):
 return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to `C{sphinx}`, `C{rst}`, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `C{!bc xxx}` where `C{xxx}` is an identifier like `C{pycod}` for code snippet in Python, `C{sys}` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `C{ptex2tex}` and defined in a configuration file `C{.ptext2tex.cfg}`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments)::

```
sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `C{pro}` and `C{cod}` are `C{python}`, `C{sys}` is `C{console}`,

## tutorial.epytext

while `C{xpro}` and `C{xcod}` are computer language specific for `C{x}` in `C{f}` (Fortran), `C{c}` (C), `C{cpp}` (C++), `C{pl}` (Perl), `C{m}` (Matlab), `C{sh}` (Unix shells), `C{cy}` (Cython), and `C{py}` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `C{!bc pro}`, while a part of a file is copied into a `C{!bc cod}` environment. What `C{pro}` and `C{cod}` mean is then defined through a `C{.ptex2tex.cfg}` file for LaTeX and a `C{sphinx code-blocks}` comment for Sphinx.

Another document can be included by writing `C{#include "mynote.do.txt"}` on a line starting with (another) hash sign. Doconce documents have extension `C{do.txt}`. The `C{do}` part stands for doconce, while the trailing `C{.txt}` denotes a text document so that editors gives you the right writing enviroment for plain text.

### Macros (Newcommands), Cross-References, Index, and Bibliography

---

Doconce supports a type of macros via a LaTeX-style `I{newcommand}` construction. The newcommands defined in a file with name `C{newcommand_replace.tex}` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `C{newcommands.tex}` and `C{newcommands_keep.tex}` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `C{!bt}` and `C{!et}` in `C{newcommands_keep.tex}` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `C{newcommands_replace.tex}` and expanded by Doconce. The definitions of newcommands in the `C{newcommands*.tex}` files `I{must}` appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `C{doc/manual/manual.do.txt}` file (see the `U{demo page<https://doconce.googlecode.com/hg/doc/demos/manual/index.html>}` for various formats of this document).

”

**tutorial.epytext**

”

From Doconce to Other Formats  
=====

Transformation of a Doconce document C{mydoc.do.txt} to various other formats applies the script C{doconce format}::

```
Terminal> doconce format format mydoc.do.txt
```

or just::

```
Terminal> doconce format format mydoc
```

The C{mako} or C{preprocess} programs are always used to preprocess the file first, and options to C{mako} or C{preprocess} can be added after the filename. For example::

```
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5 # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5 # make
o
```

The variable C{FORMAT} is always defined as the current format when running C{preprocess}. That is, in the last example, C{FORMAT} is defined as C{latex}. Inside the Doconce document one can then perform format specific actions through tests like C{#if FORMAT == "latex"}.

Inline comments in the text are removed from the output by::

```
Terminal> doconce format latex mydoc --skip_inline_comments
```

One can also remove all such comments from the original Doconce file by running::

```
Terminal> doconce remove_inline_comments mydoc
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

HTML  
----

Making an HTML version of a Doconce file C{mydoc.do.txt} is performed by::

```
Terminal> doconce format html mydoc
```

The resulting file C{mydoc.html} can be loaded into any web browser for viewing.

Pandoc  
-----

Output in the versatile Pandoc format results from::

”

”

”

” **tutorial.epytext** ”

```
Terminal> doconce format pandoc mydoc
```

The name of the output file is C{mydoc.pnd}.

From this format one can go to numerous other formats::

```
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
```

Pandoc supports C{latex}, C{html}, C{odt} (OpenOffice), C{docx} (Microsoft Word), C{rtf}, C{texinfo}, to mention some. The C{-R} option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the U{Pandoc documentation<<http://johnmacfarlane.net/pandoc/README.html>>} for the many features of the C{pandoc} program.

LaTeX  
-----

Making a LaTeX file C{mydoc.tex} from C{mydoc.do.txt} is done in two steps:

I{Step 1.} Filter the doconce text to a pre-LaTeX form C{mydoc.p.tex} for C{ptex2tex}::

```
Terminal> doconce format latex mydoc
```

LaTeX-specific commands ("newcommands") in math formulas and similar can be placed in files C{newcommands.tex}, C{newcommands\_keep.tex}, or C{newcommands\_replace.tex} (see the section "Macros (Newcommands), Cross-References, Index, and Bibliography").

If these files are present, they are included in the LaTeX document so that your commands are defined.

I{Step 2.} Run C{ptex2tex} (if you have it) to make a standard LaTeX file::

```
Terminal> ptex2tex mydoc
```

or just perform a plain copy::

```
Terminal> cp mydoc.p.tex mydoc.tex
```

Doconce generates a C{.p.tex} file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run::

```
Terminal> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX "maketitle" heading is also available through::

## tutorial.epytext

```
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
```

A separate titlepage can be generate by::

```
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
```

The `C{ptex2tex}` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `C{!bc}` command in the Doconce source you can insert verbatim block styles as defined in your `C{.ptex2tex.cfg}` file, e.g., `C{!bc cod}` for a code snippet, where `C{cod}` is set to a certain environment in `C{.ptex2tex.cfg}` (e.g., `C{CodeIntended}`). There are over 30 styles to choose from.

I{Step 3.} Compile `C{mydoc.tex}` and create the PDF file::

```
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex mydoc
Terminal> dvipdf mydoc
```

If one wishes to use the `C{Minted_Python}`, `C{Minted_Cpp}`, etc., environments in `C{ptex2tex}` for typesetting code, the `C{minted}` LaTeX package is needed. This package is included by running `C{doconce format}` with the `C{-DMINTED}` option::

```
Terminal> ptex2tex -DMINTED mydoc
```

In this case, `C{latex}` must be run with the `C{-shell-escape}` option::

```
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
```

The `C{-shell-escape}` option is required because the `C{minted.sty}` style file runs the `C{pygments}` program to format code, and this program cannot be run from `C{latex}` without the `C{-shell-escape}` option.

### Plain ASCII Text

-----

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code::



” **tutorial.epytext** ”

```
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
```

```
reStructuredText
```

```

```

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file C{mydoc.rst}::

```
Terminal> doconce format rst mydoc.do.txt
```

We may now produce various other formats::

```
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file C{mydoc.odt} can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. However, it is more convenient to use the program C{unoconv} to convert between the many formats OpenOffice supports I{on the command line}. Run::

```
Terminal> unoconv --show
```

to see all the formats that are supported. For example, the following commands take C{mydoc.odt} to Microsoft Office Open XML format, classic MS Word format, and PDF::

```
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
```

I{Remark about Mathematical Typesetting.} At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the "MS Word world". Mathematics is only fully supported by C{latex} as output and to a wide extent also supported by the C{sphinx} output format. Some links for going from LaTeX to Word are listed below.

- U{<http://ubuntuforums.org/showthread.php?t=1033441><<http://ubuntuforums.org/showthread.php?t=1033441>>}
- U{<http://tug.org/utilities/texconv/textopc.html><<http://tug.org/utilities/texconv/textopc.html>>}
- U{<http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html><<http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>>}

```
Sphinx
```

```

```

## tutorial.epytext

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the `C{doconce sphinx_dir}` command::

```
Terminal> doconce sphinx_dir author="authors' names" \
 title="some title" version=1.0 dirname=sphinx_dir \
 theme=mytheme file1 file2 file3 ...
```

The keywords `C{author}`, `C{title}`, and `C{version}` are used in the headings of the Sphinx document. By default, `C{version}` is 1.0 and the script will try to deduce authors and title from the doconce files `C{file1}`, `C{file2}`, etc. that together represent the whole document. Note that none of the individual Doconce files `C{file1}`, `C{file2}`, etc. should include the rest as their union makes up the whole document. The default value of `C{dirname}` is `C{sphinx-rootdir}`. The `C{theme}` keyword is used to set the theme for design of HTML output from Sphinx (the default theme is `C{'default'}`).

With a single-file document in `C{mydoc.do.txt}` one often just runs::

```
Terminal> doconce sphinx_dir mydoc
```

and then an appropriate Sphinx directory `C{sphinx-rootdir}` is made with relevant files.

The `C{doconce sphinx_dir}` command generates a script `C{automake-sphinx.py}` for compiling the Sphinx document into an HTML document. One can either run `C{automake-sphinx.py}` or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The `C{doconce sphinx_dir}` script copies directories named `C{figs}` or `C{figures}` over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `C{automake-sphinx.py}` must be edited accordingly. Links to local files (not `C{http:}` or `C{file:}` URLs) must be placed in the `C{_static}` subdirectory of the Sphinx directory. The utility `C{doconce sphinxfix_localURLs}` is run to check for local links: for each such link, say `C{dir1/dir2/myfile.txt}` it replaces the link by `C{_static/myfile.txt}` and copies `C{dir1/dir2/myfile.txt}` to a local `C{_static}` directory (in the same directory as the script is run). The user must copy all `C{_static/*}` files to the `C{_static}` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `C{_static}` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `C{_static}` directory and link to these directly from the Doconce document - then links do not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `C{conf.py}` configuration file for Sphinx is edited accordingly, and a script `C{make-themes.sh}` can make HTML documents with one or more themes. For example, to realize the themes `C{fenics}` and `C{pyramid}`, one writes::

## tutorial.epytext

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are C{\_build/html\_fenics} and C{\_build/html\_pyramid}, respectively. Without arguments, C{make-themes.sh} makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file C{mydoc.do.txt}.

I{Step 1.} Translate Doconce into the Sphinx format::

```
Terminal> doconce format sphinx mydoc
```

I{Step 2.} Create a Sphinx root directory either manually or by using the interactive C{sphinx-quickstart} program. Here is a scripted version of the steps with the latter::

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
EOF
```

The autogenerated C{conf.py} file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The C{doconce sphinx\_dir} generator makes an extended C{conv.py} file where, among other things, several useful Sphinx extensions are included.

I{Step 3.} Copy the C{mydoc.rst} file to the Sphinx root directory::

```
Terminal> cp mydoc.rst sphinx-rootdir
```

” **tutorial.epytext** ”

If you have figures in your document, the relative paths to those will be invalid when you work with C{mydoc.rst} in the C{sphinx-rootdir} directory. Either edit C{mydoc.rst} so that figure file paths are correct, or simply copy your figure directories to C{sphinx-rootdir}. Links to local files in C{mydoc.rst} must be modified to links to files in the C{\_static} directory, see comment above.

I{Step 4.} Edit the generated C{index.rst} file so that C{mydoc.rst} is included, i.e., add C{mydoc} to the C{toctree} section so that it becomes::

```
.. toctree::
 :maxdepth: 2

 mydoc
```

(The spaces before C{mydoc} are important!)

I{Step 5.} Generate, for instance, an HTML version of the Sphinx source::

```
make clean # remove old versions
make html
```

Sphinx can generate a range of different formats: standalone HTML, HTML in separate directories with C{index.html} files, a large single HTML file, JSON files, various help files (the qthelp, HTML, and Devhelp projects), epub, LaTeX, PDF (via LaTeX), pure text, man pages, and Texinfo files.

I{Step 6.} View the result::

```
Terminal> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows C{!bc}: C{cod} gives Python (C{code-block:: python} in Sphinx syntax) and C{cppcod} gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by U{Google Code<<http://code.google.com/p/support/wiki/WikiSyntax>>}. The transformation to this format, called C{gwiki} to explicitly mark it as the Google Code dialect, is done by::

```
Terminal> doconce format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the C{mydoc.gwiki} output file from C{doconce format} and paste the file contents into the wiki page. Press B{Preview} or B{Save Page} to see the formatted result.

## tutorial.epytext

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

### Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the C{.rst} file is going to be filtered to LaTeX or HTML, it cannot know if C{.eps} or C{.png} is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., sed, perl, python, or scitools subst, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The C{make.sh} files in C{docs/manual} and C{docs/tutorial} constitute comprehensive examples on how such scripts can be made.

### Demos

The current text is generated from a Doconce format stored in the file::

```
docs/tutorial/tutorial.do.txt
```

The file C{make.sh} in the C{tutorial} directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, C{tutorial.do.txt} is the starting point. Running C{make.sh} and studying the various generated files and comparing them with the original C{tutorial.do.txt} file, gives a quick introduction to how Doconce is used in a real case. U{Here<<https://doconce.googlecode.com/hg/doc/demos/tutorial/index.html>>} is a sample of how this tutorial looks in different formats.

There is another demo in the C{docs/manual} directory which translates the more comprehensive documentation, C{manual.do.txt}, to various formats. The C{make.sh} script runs a set of translations.

### Dependencies and Installation

Doconce itself is pure Python code hosted at U{<http://code.google.com/p/doconce><<http://code.google.com/p/doconce>>}. Its installation from the Mercurial (C{hg}) source follows the standard procedure::

```
Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
cd ..
```

## tutorial.epytext

If you make use of the `U{Preprocess<http://code.google.com/p/preprocess>}` preprocessor, this program must be installed::

```
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
```

A much more advanced alternative to Preprocess is `U{Mako<http://www.makotemplates.org>}`. Its installation is most conveniently done by `C{pip}`::

```
pip install Mako
```

This command requires `C{pip}` to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by::

```
sudo apt-get install python-pip
```

Alternatively, one can install from the `C{pip}` `U{source code<http://pypi.python.org/pypi/pip>}`.

To make LaTeX documents (without going through the reStructuredText format) you need `U{ptex2tex<http://code.google.com/p/ptex2tex>}`, which is installed by::

```
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
```

As seen, `C{cp2texmf.sh}` copies some special stylefiles that that `C{ptex2tex}` potentially makes use of. Some more standard stylefiles are also needed. These are installed by::

```
sudo apt-get install texlive-latex-extra
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the `C{~/texmf/tex/latex/misc}` directory).

The `I{minted}` LaTeX style is offered by `C{ptex2tex}` and popular among users. This style requires the package `U{Pygments<http://pygments.org>}`::

```
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
```

If you use the minted style, you have to enable it by running

”

**tutorial.epytext**

”

`C{ptex2tex -DMINTED}` and then `C{latex -shell-escape}`, see the the section "From Doconce to Other Formats".

For `C{rst}` output and further transformation to LaTeX, HTML, XML, OpenOffice, and so on, one needs `U{docutils<http://docutils.sourceforge.net>}`. The installation can be done by::

```
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/
docutils
cd docutils
sudo python setup.py install
cd ..
```

To use the OpenOffice suite you will typically on Debian systems install::

```
sudo apt-get install unovonv libreoffice libreoffice-dmaths
```

There is a possibility to create PDF files from reST documents using ReportLab instead of LaTeX. The enabling software is `U{rst2pdf<http://code.google.com/p/rst2pdf>}`. Either download the tarball or clone the svn repository, go to the `C{rst2pdf}` directory and run `C{sudo python setup.py install}`.

Output to `C{sphinx}` requires of course `U{Sphinx<http://sphinx.pocoo.org>}`, installed by::

```
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
```

When the output format is `C{epydok}` one needs that program too, installed by::

```
svn co https://epydok.svn.sourceforge.net/svnroot/epydok/trunk/epydok epydok
cd epydok
sudo make install
cd ..
```

Finally, translation to `C{pandoc}` requires the `U{Pandoc<http://johnmacfarlane.net/pandoc/>}` program (written in Haskell) to be installed::

```
sudo apt-get install pandoc
```

`I{Remark.}` Several of the packages above installed from source code are also available in Debian-based system through the `C{apt-get install}` command. However, we recommend installation directly

”

”

”

”

**tutorial.epytext**

”

from the version control system repository as there might be important updates and bug fixes. For C{svn} directories, go to the directory, run C{svn update}, and then C{sudo python setup.py install}. For Mercurial (C{hg}) directories, go to the directory, run C{hg pull; hg update}, and then C{sudo python setup.py install}. Doconce itself is frequently updated so these commands should be run regularly.



## tutorial.gwiki

#summary Doconce: Document Once, Include Anywhere  
 <wiki:toc max\_depth="2" />  
 By \*Hans Petter Langtangen\*

==== Feb 27, 2012 ====

\* When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?

\* Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like [http://refcards.com/docs/silvermanj/amslatex/LaTeXRefCard.v2.0.pdf LaTeX], [http://www.htmlcodetutorial.com/ HTML], [http://docutils.sourceforge.net/docs/ref/rst/restructuredtext.html reStructuredText], [http://sphinx.pocoo.org/contents.html Sphinx], and [http://code.google.com/p/support/wiki/WikiSyntax wiki]? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?

\* Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

== The Doconce Concept ==

Doconce is two things:

# Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via 'rst2\*' programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via 'unoconv') to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.

# Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: "Write once, include anywhere".

Here are some Doconce features:

\* Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than LaTeX and HTML.

\* Doconce can be converted to plain \*untagged\* text, often desirable for computer programs and email.

\* Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.

\* Doconce has full support for LaTeX math, and integrates very well with bi

## tutorial.gwiki

g LaTeX projects (books).

- \* Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.

- \* Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- \* Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.

- \* Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.

- \* Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.

== What Does Doconce Look Like? ==

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- \* Bullet lists arise from lines starting with an asterisk.
- \* *\*Emphasized words\** are surrounded by asterisks.
- \* **\*Words in boldface\*** are surrounded by underscores.
- \* Words from computer code are enclosed in back quotes and then typeset 'verbatim' (in a monospace font).

- \* Section headings are recognized by equality ('=') signs before and after the title, and the number of '=' signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.

- \* Paragraph headings are recognized by a double underscore before and after the heading.

- \* The abstract of a document starts with *\*Abstract\** as paragraph heading, a

## tutorial.gwiki

nd all text up to the next heading makes up the abstract,

- \* Blocks of computer code can easily be included by placing  `'!bc'`  (begin code) and  `'!ec'`  (end code) commands at separate lines before and after the code block.
- \* Blocks of computer code can also be imported from source files.
- \* Blocks of LaTeX mathematics can easily be included by placing  `'!bt'`  (begin TeX) and  `'!et'`  (end TeX) commands at separate lines before and after the math block.
- \* There is support for both LaTeX and text-like inline mathematics.
- \* Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- \* Invisible comments in the output format can be inserted throughout the text ( `'#'`  at the beginning of a line).
- \* Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- \* There is special support for advanced exercises features.
- \* With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- \* With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
{{{
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for  `_boldface_`  words,  `*emphasized*`  words, and  `'computer'`  words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in  `"hpl": "http://folk.uio.no/hpl"` . If the word is URL, the URL itself becomes the link name, as in  `"URL": "tutorial.do.txt"` .

References to sections may use logical names as labels (e.g., a  `"label"`  command right after the section title), as in the reference to  `Section ref{my:first:sec}` .

Doconce also allows inline comments such as  `[hpl: here I will make some remarks to the text]`  for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see  `Section ref{doconce2formats}`  for an example).

Tables are also supported, e.g.,

|      |          |              |
|------|----------|--------------|
| time | velocity | acceleration |
| ---  | ---      | ---          |

## tutorial.gwiki

|     |          |           |
|-----|----------|-----------|
| 0.0 | 1.4186   | -5.01     |
| 2.0 | 1.376512 | 11.919    |
| 4.0 | 1.1E+1   | 14.717624 |

# lines beginning with # are comment lines  
 }}}

The Doconce text above results in the following little document:

==== A Subsection with Sample Text ====

Ordinary text looks like ordinary text, and the tags used for *\*boldface\** words, *\*emphasized\** words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have numbered items instead of bullets, just use an `'o'` (for ordered) instead of the asterisk:

- # item 1
- # item 2
- # item 3

URLs with a link word are possible, as in `[http://folk.uio.no/hpl hpl]`. If the word is URL, the URL itself becomes the link name, as in `tutorial.do.txt`.

References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to the section `[#A_Subsection_with_Sample_Text]`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section `[#From_Doconce_to_Other_Formats]` for an example).

Tables are also supported, e.g.,

| <i>*time*</i> | <i>*velocity*</i> | <i>*acceleration*</i> |
|---------------|-------------------|-----------------------|
| 0.0           | 1.4186            | -5.01                 |
| 2.0           | 1.376512          | 11.919                |
| 4.0           | 1.1E+1            | 14.717624             |

==== Mathematics and Computer Code ====

Inline mathematics, such as `'v = sin(x)'`, allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like `'v = sin(x)'` is typeset as

```

{{{
$\nu = \sin(x)$| $v = \sin(x)$

```

”

**tutorial.gwiki**

”

}}}

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `'!bt'` and `'!et'` (begin tex / end tex) instructions.

The result looks like this:

```

{{{
\begin{eqnarray}
{\partial u \over \partial t} &=& \nabla^2 u + f, \text{label{myeq1}} \\
{\partial v \over \partial t} &=& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
}}}
```

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `'!bc'` and `'!ec'` instructions, respectively. Such blocks look like

```

{{{
from math import sin, pi
def myfunc(x):
 return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
}}}
```

A code block must come after some plain sentence (at least for successful output to `'sphinx'`, `'rst'`, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `'!bc xxx'` where `'xxx'` is an identifier like `'pycod'` for code snippet in Python, `'sys'` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `'ptex2tex'` and defined in a configuration file `'.ptext2tex.cfg'`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```

{{{
sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
}}}
```

By default, `'pro'` and `'cod'` are `'python'`, `'sys'` is `'console'`, while `'xpro'` and `'xcod'` are computer language specific for `'x'` in `'f'` (Fortran), `'c'` (C), `'cpp'` (C++), `'pl'` (Perl), `'m'` (Matlab), `'sh'` (Unix shells), `'cy'` (Cython), and `'py'` (Python).

<wiki:comment> (Any sphinx code-block comment, whether inside verbatim code </wiki:comment>

<wiki:comment> blocks or outside, yields a mapping between bc arguments </wiki:comment>

<wiki:comment> and computer languages. In case of multiple definitions, the </wiki:comment>

<wiki:comment> first one is used.) </wiki:comment>

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of

”

”

”

## tutorial.gwiki

avoiding copying information!). A complete file is typeset with `'!bc pro'`, while a part of a file is copied into a `'!bc cod'` environment. What `'pro'` and `'cod'` mean is then defined through a `'.ptex2tex.cfg'` file for LaTeX and a `'sphinx code-blocks'` comment for Sphinx.

Another document can be included by writing `'#include "mynote.do.txt"'` on a line starting with (another) hash sign. Doconce documents have extension `'do.txt'`. The `'do'` part stands for doconce, while the trailing `'.txt'` denotes a text document so that editors gives you the right writing enviroment for plain text.

==== Macros (Newcommands), Cross-References, Index, and Bibliography ====

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name `'newcommand_replace.tex'` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `'newcommands.tex'` and `'newcommands_keep.tex'` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `'!bt'` and `'!et'` in `'newcommands_keep.tex'` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `'newcommands_replace.tex'` and expanded by Doconce. The definitions of newcommands in the `'newcommands*.tex'` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `'doc/manual/manual.do.txt'` file (see the [<https://doconce.googlecode.com/hg/doc/demos/manual/index.html> demo page] for various formats of this document).

<wiki:comment> Example on including another Doconce file (using preprocess): </wiki:comment>

== From Doconce to Other Formats ==

Transformation of a Doconce document `'mydoc.do.txt'` to various other formats applies the script `'doconce format'`:

```

{{{
Terminal> doconce format format mydoc.do.txt
}}}
```

## tutorial.gwiki

or just

```
{{{
Terminal> doconce format format mydoc
}}}
```

The 'mako' or 'preprocess' programs are always used to preprocess the file first, and options to 'mako' or 'preprocess' can be added after the filename. For example,

```
{{{
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5 # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5 # mako
}}}
```

The variable 'FORMAT' is always defined as the current format when running 'preprocess'. That is, in the last example, 'FORMAT' is defined as 'latex'. Inside the Doconce document one can then perform format specific actions through tests like '#if FORMAT == "latex"'.

Inline comments in the text are removed from the output by

```
{{{
Terminal> doconce format latex mydoc --skip_inline_comments
}}}
```

One can also remove all such comments from the original Doconce file by running:

```
{{{
Terminal> doconce remove_inline_comments mydoc
}}}
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

==== HTML ====

Making an HTML version of a Doconce file 'mydoc.do.txt' is performed by

```
{{{
Terminal> doconce format html mydoc
}}}
```

The resulting file 'mydoc.html' can be loaded into any web browser for viewing.

==== Pandoc ====

Output in the versatile Pandoc format results from

```
{{{
Terminal> doconce format pandoc mydoc
}}}
```

The name of the output file is 'mydoc.pnd'.

From this format one can go to numerous other formats:

```
{{{
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
}}}
```

Pandoc supports 'latex', 'html', 'odt' (OpenOffice), 'docx' (Microsoft Word), 'rtf', 'texinfo', to mention some. The '-R' option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the [<http://johnmacfarlane.net/pandoc/README.html> Pandoc documentation] for the many features of the 'pandoc' program.

==== LaTeX ====

Making a LaTeX file 'mydoc.tex' from 'mydoc.do.txt' is done in two steps:

<wiki:comment> Note: putting code blocks inside a list is not successful in many

## tutorial.gwiki

```

</wiki:comment>
<wiki:comment> formats - the text may be messed up. A better choice is a paragraph </wiki:comment>
<wiki:comment> environment, as used here. </wiki:comment>

Step 1. Filter the doconce text to a pre-LaTeX form 'mydoc.p.tex' for
'ptex2tex':
{{{
Terminal> doconce format latex mydoc
}}}
LaTeX-specific commands ("newcommands") in math formulas and similar
can be placed in files 'newcommands.tex', 'newcommands_keep.tex', or
'newcommands_replace.tex' (see the section [#Macros_(Newcommands),_Cross-Referen
ces,_Index,_and_Bibliography]).
If these files are present, they are included in the LaTeX document
so that your commands are defined.

Step 2. Run 'ptex2tex' (if you have it) to make a standard LaTeX file,
{{{
Terminal> ptex2tex mydoc
}}}
or just perform a plain copy,
{{{
Terminal> cp mydoc.p.tex mydoc.tex
}}}
Doconce generates a '.p.tex' file with some preprocessor macros
that can be used to steer certain properties of the LaTeX document.
For example, to turn on the Helvetica font instead of the standard
Computer Modern font, run
{{{
Terminal> ptex2tex -DHELVETICA mydoc
}}}
The title, authors, and date are by default typeset in a non-standard
way to enable a nicer treatment of multiple authors having
institutions in common. However, the standard LaTeX "maketitle" heading
is also available through
{{{
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
}}}
A separate titlepage can be generate by
{{{
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
}}}

The 'ptex2tex' tool makes it possible to easily switch between many
different fancy formattings of computer or verbatim code in LaTeX
documents. After any '!bc' command in the Doconce source you can
insert verbatim block styles as defined in your '.ptex2tex.cfg'
file, e.g., '!bc cod' for a code snippet, where 'cod' is set to
a certain environment in '.ptex2tex.cfg' (e.g., 'CodeIntended').
There are over 30 styles to choose from.

Step 3. Compile 'mydoc.tex'
and create the PDF file:
{{{
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography

```



## tutorial.gwiki

```

Terminal> latex mydoc
Terminal> dvipdf mydoc
}}}
If one wishes to use the 'Minted_Python', 'Minted_Cpp', etc., environments
in 'ptex2tex' for typesetting code, the 'minted' LaTeX package is needed.
This package is included by running 'doconce format' with the
'-DMINTED' option:
{{{
Terminal> ptex2tex -DMINTED mydoc
}}}
In this case, 'latex' must be run with the
'-shell-escape' option:
{{{
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
}}}
The '-shell-escape' option is required because the 'minted.sty' style
file runs the 'pygments' program to format code, and this program
cannot be run from 'latex' without the '-shell-escape' option.

==== Plain ASCII Text ====

We can go from Doconce "back to" plain untagged text suitable for viewing
in terminal windows, inclusion in email text, or for insertion in
computer source code:
{{{
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
}}}

==== reStructuredText ====

Going from Doconce to reStructuredText gives a lot of possibilities to
go to other formats. First we filter the Doconce text to a
reStructuredText file 'mydoc.rst':
{{{
Terminal> doconce format rst mydoc.do.txt
}}}
We may now produce various other formats:
{{{
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
}}}

The OpenOffice file 'mydoc.odt' can be loaded into OpenOffice and
saved in, among other things, the RTF format or the Microsoft Word format.
However, it is more convenient to use the program 'unovonv'
to convert between the many formats OpenOffice supports *on the command line*.
Run
{{{
Terminal> unoconv --show
}}}
to see all the formats that are supported.
For example, the following commands take

```

## tutorial.gwiki

'mydoc.odt' to Microsoft Office Open XML format, classic MS Word format, and PDF:

```
{
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
}
```

\*Remark about Mathematical Typesetting.\* At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the "MS Word world". Mathematics is only fully supported by 'latex' as output and to a wide extent also supported by the 'sphinx' output format. Some links for going from LaTeX to Word are listed below.

- \* <http://ubuntuforums.org/showthread.php?t=1033441>
- \* <http://tug.org/utilities/texconv/textopc.html>
- \* <http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>

==== Sphinx ====

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the 'doconce sphinx\_dir' command:

```
{
Terminal> doconce sphinx_dir author="authors' names" \
 title="some title" version=1.0 dirname=sphinxdir \
 theme=mytheme file1 file2 file3 ...
}
```

The keywords 'author', 'title', and 'version' are used in the headings of the Sphinx document. By default, 'version' is 1.0 and the script will try to deduce authors and title from the doconce files 'file1', 'file2', etc. that together represent the whole document. Note that none of the individual Doconce files 'file1', 'file2', etc. should include the rest as their union makes up the whole document. The default value of 'dirname' is 'sphinx-rootdir'. The 'theme' keyword is used to set the theme for design of HTML output from Sphinx (the default theme is 'default').

With a single-file document in 'mydoc.do.txt' one often just runs

```
{
Terminal> doconce sphinx_dir mydoc
}
```

and then an appropriate Sphinx directory 'sphinx-rootdir' is made with relevant files.

The 'doconce sphinx\_dir' command generates a script 'automake-sphinx.py' for compiling the Sphinx document into an HTML document. One can either run 'automake-sphinx.py' or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The 'doconce sphinx\_dir' script copies directories named 'figs' or 'figures' over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, 'automake-sphinx.py' must be edited accordingly. Links to local files (not 'http:' or 'file:' URLs) must be placed in the '\_static' subdirectory of the Sphinx directory. The

## tutorial.gwiki

utility `'doconce sphinxfix_localURLs'` is run to check for local links: for each such link, say `'dirl/dir2/myfile.txt'` it replaces the link by `'_static/myfile.txt'` and copies `'dirl/dir2/myfile.txt'` to a local `'_static'` directory (in the same directory as the script is run). The user must copy all `'_static/*'` files to the `'_static'` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `'_static'` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `'_static'` directory and link to these directly from the Doconce document - then links to not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `'conf.py'` configuration file for Sphinx is edited accordingly, and a script `'make-themes.sh'` can make HTML documents with one or more themes. For example,

```
to realize the themes 'fenics' and 'pyramid', one writes
{{{
Terminal> ./make-themes.sh fenics pyramid
}}}
```

The resulting directories with HTML documents are `'_build/html_fenics'` and `'_build/html_pyramid'`, respectively. Without arguments, `'make-themes.sh'` makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file `'mydoc.do.txt'`.

**\*Step 1.\*** Translate Doconce into the Sphinx format:

```
{{{
Terminal> doconce format sphinx mydoc
}}}
```

**\*Step 2.\*** Create a Sphinx root directory either manually or by using the interactive `'sphinx-quickstart'` program. Here is a scripted version of the steps with the latter:

```
{{{
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
y
n
n
n
n
y
n
}}}
```

## tutorial.gwiki

```

n
Y
Y
Y
EOF
}}}
```

The autogenerated 'conf.py' file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The 'doconce sphinx\_dir' generator makes an extended 'conv.py' file where, among other things, several useful Sphinx extensions are included.

**\*Step 3.\*** Copy the 'mydoc.rst' file to the Sphinx root directory:

```

{{{
Terminal> cp mydoc.rst sphinx-rootdir
}}}
```

If you have figures in your document, the relative paths to those will be invalid when you work with 'mydoc.rst' in the 'sphinx-rootdir' directory. Either edit 'mydoc.rst' so that figure file paths are correct, or simply copy your figure directories to 'sphinx-rootdir'. Links to local files in 'mydoc.rst' must be modified to links to files in the '\_static' directory, see comment above.

**\*Step 4.\*** Edit the generated 'index.rst' file so that 'mydoc.rst' is included, i.e., add 'mydoc' to the 'toctree' section so that it becomes

```

{{{
.. toctree::
 :maxdepth: 2

 mydoc
}}}
```

(The spaces before 'mydoc' are important!)

**\*Step 5.\*** Generate, for instance, an HTML version of the Sphinx source:

```

{{{
make clean # remove old versions
make html
}}}
```

Sphinx can generate a range of different formats: standalone HTML, HTML in separate directories with 'index.html' files, a large single HTML file, JSON files, various help files (the qthelp, HTML, and Devhelp projects), epub, LaTeX, PDF (via LaTeX), pure text, man pages, and Texinfo files.

**\*Step 6.\*** View the result:

```

{{{
Terminal> firefox _build/html/index.html
}}}
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows '!bc': 'cod' gives Python ('code-block:: python' in Sphinx syntax) and 'cppcod' gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

==== Google Code Wiki ====

There are several different wiki dialects, but Doconce only support the

## tutorial.gwiki

one used by [<http://code.google.com/p/support/wiki/WikiSyntax> Google Code]. The transformation to this format, called 'gwiki' to explicitly mark it as the Google Code dialect, is done by

```
{
Terminal> doconce format gwiki mydoc.do.txt
}
```

You can then open a new wiki page for your Google Code project, copy the 'mydoc.gwiki' output file from 'doconce format' and paste the file contents into the wiki page. Press \*Preview\* or \*Save Page\* to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

### ==== Tweaking the Doconce Output ====

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the '.rst' file is going to be filtered to LaTeX or HTML, it cannot know if '.eps' or '.png' is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., sed, perl, python, or scitools subst, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The 'make.sh' files in 'docs/manual' and 'docs/tutorial' constitute comprehensive examples on how such scripts can be made.

### ==== Demos ====

The current text is generated from a Doconce format stored in the file

```
{
docs/tutorial/tutorial.do.txt
}
```

The file 'make.sh' in the 'tutorial' directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, 'tutorial.do.txt' is the starting point. Running 'make.sh' and studying the various generated files and comparing them with the original 'tutorial.do.txt' file, gives a quick introduction to how Doconce is used in a real case. [<https://doconce.googlecode.com/hg/doc/demos/tutorial/index.html> Here] is a sample of how this tutorial looks in different formats.

There is another demo in the 'docs/manual' directory which translates the more comprehensive documentation, 'manual.do.txt', to various formats. The 'make.sh' script runs a set of translations.

### ==== Dependencies and Installation ====

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial ('hg') source follows the standard procedure:

```
{
Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
}
```

## tutorial.gwiki

```
cd ..
}}}
```

If you make use of the [<http://code.google.com/p/preprocess> Preprocess] preprocessor, this program must be installed:

```
{{{
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
}}}
```

A much more advanced alternative to Preprocess is [<http://www.makotemplates.org> Mako]. Its installation is most conveniently done by 'pip',

```
{{{
pip install Mako
}}}
```

This command requires 'pip' to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by

```
{{{
sudo apt-get install python-pip
}}}
```

Alternatively, one can install from the 'pip' [<http://pypi.python.org/pypi/pip> source code].

To make LaTeX documents (without going through the reStructuredText format) you need [<http://code.google.com/p/ptex2tex> ptex2tex], which is installed by

```
{{{
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
}}}
```

As seen, 'cp2texmf.sh' copies some special stylefiles that that 'ptex2tex' potentially makes use of. Some more standard stylefiles are also needed. These are installed by

```
{{{
sudo apt-get install texlive-latex-extra
}}}
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the '~/texmf/tex/latex/misc' directory).

The \*minted\* LaTeX style is offered by 'ptex2tex' and popular among users. This style requires the package [<http://pygments.org> Pygments]:

```
{{{
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
}}}
```

If you use the minted style, you have to enable it by running 'ptex2tex -DMINTED' and then 'latex -shell-escape', see the the section [[From\\_Doconce\\_to\\_Other\\_Formats](#)].

”

**tutorial.gwiki**

”

For 'rst' output and further transformation to LaTeX, HTML, XML, OpenOffice, and so on, one needs [<http://docutils.sourceforge.net> docutils]. The installation can be done by

```
{{{
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..
}}}
```

To use the OpenOffice suite you will typically on Debian systems install

```
{{{
sudo apt-get install unovonv libreoffice libreoffice-dmaths
}}}
```

There is a possibility to create PDF files from reST documents using ReportLab instead of LaTeX. The enabling software is [<http://code.google.com/p/rst2pdf> rst2pdf]. Either download the tarball or clone the svn repository, go to the 'rst2pdf' directory and run 'sudo python setup.py install'.

Output to 'sphinx' requires of course [<http://sphinx.pocoo.org> Sphinx], installed by

```
{{{
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
}}}
```

When the output format is 'epydoc' one needs that program too, installed by

```
{{{
svn co https://epydoc.svn.sourceforge.net/svnroot/epydoc/trunk/epydoc epydoc
cd epydoc
sudo make install
cd ..
}}}
```

Finally, translation to 'pandoc' requires the [<http://johnmacfarlane.net/pandoc/> Pandoc] program (written in Haskell) to be installed.

```
{{{
sudo apt-get install pandoc
}}}
```

\*Remark.\* Several of the packages above installed from source code are also available in Debian-based system through the 'apt-get install' command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For 'svn' directories, go to the directory, run 'svn update', and then 'sudo python setup.py install'. For Mercurial ('hg') directories, go to the directory, run 'hg pull; hg update', and then 'sudo python setup.py install'. Doconce itself is frequently updated so these commands should be run regularly.

” **tutorial.pnd** ”

% Doconce: Document Once, Include Anywhere

% Hans Petter Langtangen at Simula Research Laboratory and University of Oslo

% Feb 27, 2012

- \* When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- \* Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like [LaTeX](<http://refcards.com/docs/silvermanj/amslatex/LaTeXRefCard.v2.0.pdf>), [HTML](<http://www.htmlcodetutorial.com/>), [reStructuredText](<http://docutils.sourceforge.net/docs/ref/rst/restructuredtext.html>), [Sphinx](<http://sphinx.pocoo.org/contents.html>), and [wiki](<http://code.google.com/p/support/wiki/WikiSyntax>)? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- \* Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.

#### The Doconce Concept

=====

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via 'rst2\*' programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via 'unoconv') to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.
2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: "Write once, include anywhere".

Here are some Doconce features:

- \* Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than



” **tutorial.pnd** ”

LaTeX and HTML.

- \* Doconce can be converted to plain `*untagged*` text, often desirable for computer programs and email.
- \* Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- \* Doconce has full support for LaTeX math, and integrates very well with big LaTeX projects (books).
- \* Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- \* Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- \* Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- \* Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.
- \* Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.

What Does Doconce Look Like?

=====

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

## tutorial.pnd

- \* Bullet lists arise from lines starting with an asterisk.
- \* *\*Emphasized words\** are surrounded by asterisks.
- \* Words in boldface are surrounded by underscores.
- \* Words from computer code are enclosed in back quotes and then typeset `'verbatim (in a monospace font)'`.
- \* Section headings are recognized by equality (`'='`) signs before and after the title, and the number of `'='` signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- \* Paragraph headings are recognized by a double underscore before and after the heading.
- \* The abstract of a document starts with *\*Abstract\** as paragraph heading, and all text up to the next heading makes up the abstract,
- \* Blocks of computer code can easily be included by placing `'!bc'` (begin code) and `'!ec'` (end code) commands at separate lines before and after the code block.
- \* Blocks of computer code can also be imported from source files.
- \* Blocks of LaTeX mathematics can easily be included by placing `'!bt'` (begin TeX) and `'!et'` (end TeX) commands at separate lines before and after the math block.
- \* There is support for both LaTeX and text-like inline mathematics.
- \* Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- \* Invisible comments in the output format can be inserted throughout the text (`'#'` at the beginning of a line).
- \* Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- \* There is special support for advanced exercises features.
- \* With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- \* With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
~~~~~
===== A Subsection with Sample Text =====
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for

” **tutorial.pnd** ”

`_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `"hpl":"http://folk.uio.no/hpl"`. If the word is URL, the URL itself becomes the link name, as in `"URL":"tutorial.do.txt"`.

References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to `Section ref{my:first:sec}`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Section ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

# lines beginning with # are comment lines

~~~~~

The Doconce text above results in the following little document:

A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- * item 1
- * item 2
- * item 3

Lists can also have numbered items instead of bullets, just use an `'o'` (for ordered) instead of the asterisk:

1. item 1

”

tutorial.pnd

”

2. item 2

3. item 3

URLs with a link word are possible, as in [hpl](http://folk.uio.no/hpl). If the word is URL, the URL itself becomes the link name, as in <tutorial.do.txt>.

References to sections may use logical names as labels (e.g., a "label" command right after the section title), as in the reference to the section [A Subsection with Sample Text](#t).

Doconce also allows inline comments such as [hpl: here I will make some remarks to the text] for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section [From Doconce to Other Formats](#s) for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

Mathematics and Computer Code

Inline mathematics, such as $\nu = \sin(x)$, allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like $\nu = \sin(x)$ is typeset as

```
~~~~~
 $\nu = \sin(x)$  |  $\nu = \sin(x)$ 
~~~~~
```

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `'!bt'` and `'!et'` (begin tex / end tex) instructions. The result looks like this:

```
\begin{eqnarray}
\{\partial u \over \partial t\} &=& \nabla^2 u + f, \text{label{myeq1}} \\
\{\partial v \over \partial t\} &=& \nabla \cdot (q(u) \nabla v) + g
\end{eqnarray}
```

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

” **tutorial.pnd** ”

You can have blocks of computer code, starting and ending with
`‘!bc’` and `‘!ec’` instructions, respectively. Such blocks look like

```
~~~~~{.Python}
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
~~~~~
```

A code block must come after some plain sentence (at least for successful output to `‘sphinx’`, `‘rst’`, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `‘!bc xxx’` where `‘xxx’` is an identifier like `‘pycod’` for code snippet in Python, `‘sys’` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `‘ptex2tex’` and defined in a configuration file `‘.ptext2tex.cfg’`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
~~~~~
# sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
~~~~~
```

By default, `‘pro’` and `‘cod’` are `‘python’`, `‘sys’` is `‘console’`, while `‘xpro’` and `‘xcod’` are computer language specific for `‘x’` in `‘f’` (Fortran), `‘c’` (C), `‘cpp’` (C++), `‘pl’` (Perl), `‘m’` (Matlab), `‘sh’` (Unix shells), `‘cy’` (Cython), and `‘py’` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `‘!bc pro’`, while a part of a file is copied into a `‘!bc cod’` environment. What `‘pro’` and `‘cod’` mean is then defined through a `‘.ptex2tex.cfg’` file for LaTeX and a `‘sphinx code-blocks’` comment for Sphinx.

Another document can be included by writing `‘#include “mynote.do.txt”’` on a line starting with (another) hash sign. Doconce documents have extension `‘do.txt’`. The `‘do’` part stands for doconce, while the trailing `‘.txt’` denotes a text document so that editors gives you the right writing enviroment for plain text.

Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style `*newcommand*` construction. The newcommands defined in a file with name `‘newcommand_replace.tex’` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion

tutorial.pnd

itself). Newcommands in files with names `'newcommands.tex'` and `'newcommands_keep.tex'` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `'!bt'` and `'!et'` in `'newcommands_keep.tex'` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `'newcommands_replace.tex'` and expanded by Doconce. The definitions of newcommands in the `'newcommands*.tex'` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `'doc/manual/manual.do.txt'` file (see the [demo page](<https://doconce.googlecode.com/hg/doc/demos/manual/index.html>) for various formats of this document).

From Doconce to Other Formats

Transformation of a Doconce document `'mydoc.do.txt'` to various other formats applies the script `'doconce format'`:

```
~~~~~{.Bash}
Terminal> doconce format format mydoc.do.txt
~~~~~
```

or just

```
~~~~~{.Bash}
Terminal> doconce format format mydoc
~~~~~
```

The `'mako'` or `'preprocess'` programs are always used to preprocess the file first, and options to `'mako'` or `'preprocess'` can be added after the filename. For example,

```
~~~~~{.Bash}
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5      # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5  # mako
~~~~~
```

The variable `'FORMAT'` is always defined as the current format when running `'preprocess'`. That is, in the last example, `'FORMAT'` is defined as `'latex'`. Inside the Doconce document one can then perform

”

tutorial.pnd

”

format specific actions through tests like `'#if FORMAT == "latex"'`.

Inline comments in the text are removed from the output by

```
~~~~~{.Bash}
Terminal> doconce format latex mydoc --skip_inline_comments
~~~~~
```

One can also remove all such comments from the original Doconce file by running:

```
~~~~~
Terminal> doconce remove_inline_comments mydoc
~~~~~
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

HTML

Making an HTML version of a Doconce file `'mydoc.do.txt'` is performed by

```
~~~~~{.Bash}
Terminal> doconce format html mydoc
~~~~~
```

The resulting file `'mydoc.html'` can be loaded into any web browser for viewing.

Pandoc

Output in the versatile Pandoc format results from

```
~~~~~{.Bash}
Terminal> doconce format pandoc mydoc
~~~~~
```

The name of the output file is `'mydoc.pnd'`.
From this format one can go to numerous other formats:

```
~~~~~{.Bash}
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
~~~~~
```

Pandoc supports `'latex'`, `'html'`, `'odt'` (OpenOffice), `'docx'` (Microsoft Word), `'rtf'`, `'texinfo'`, to mention some. The `'-R'` option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the [Pandoc documentation](<http://johnmacfarlane.net/pandoc/README.html>) for the many features of the `'pandoc'` program.

LaTeX

Making a LaTeX file `'mydoc.tex'` from `'mydoc.do.txt'` is done in two steps:

tutorial.pnd

Step 1. Filter the doconce text to a pre-LaTeX form 'mydoc.p.tex' for 'ptex2tex':

```
~~~~~{.Bash}
Terminal> doconce format latex mydoc
~~~~~
```

LaTeX-specific commands ("newcommands") in math formulas and similar can be placed in files 'newcommands.tex', 'newcommands_keep.tex', or 'newcommands_replace.tex' (see the section [Macros (Newcommands), Cross-References, Index, and Bibliography](#y)). If these files are present, they are included in the LaTeX document so that your commands are defined.

Step 2. Run 'ptex2tex' (if you have it) to make a standard LaTeX file,

```
~~~~~{.Bash}
Terminal> ptex2tex mydoc
~~~~~
```

or just perform a plain copy,

```
~~~~~{.Bash}
Terminal> cp mydoc.p.tex mydoc.tex
~~~~~
```

Doconce generates a '.p.tex' file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run

```
~~~~~{.Bash}
Terminal> ptex2tex -DHELVETICA mydoc
~~~~~
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX "maketitle" heading is also available through

```
~~~~~{.Bash}
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
~~~~~
```

A separate titlepage can be generate by

```
~~~~~{.Bash}
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
~~~~~
```

The 'ptex2tex' tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any '!bc' command in the Doconce source you can insert verbatim block styles as defined in your '.ptex2tex.cfg' file, e.g., '!bc cod' for a code snippet, where 'cod' is set to a certain environment in '.ptex2tex.cfg' (e.g., 'CodeIntended'). There are over 30 styles to choose from.

tutorial.pnd

Step 3. Compile 'mydoc.tex'
and create the PDF file:

```
~~~~~{.Bash}
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
Terminal> latex mydoc
Terminal> dvipdf mydoc
~~~~~
```

If one wishes to use the 'Minted_Python', 'Minted_Cpp', etc., environments in 'ptex2tex' for typesetting code, the 'minted' LaTeX package is needed. This package is included by running 'doconce format' with the '-DMINTED' option:

```
~~~~~{.Bash}
Terminal> ptex2tex -DMINTED mydoc
~~~~~
```

In this case, 'latex' must be run with the '-shell-escape' option:

```
~~~~~{.Bash}
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
~~~~~
```

The '-shell-escape' option is required because the 'minted.sty' style file runs the 'pygments' program to format code, and this program cannot be run from 'latex' without the '-shell-escape' option.

Plain ASCII Text

We can go from Doconce "back to" plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
~~~~~{.Bash}
Terminal> doconce format plain mydoc.do.txt  # results in mydoc.txt
~~~~~
```

reStructuredText

Going from Doconce to reStructuredText gives a lot of possibilities to go to other formats. First we filter the Doconce text to a reStructuredText file 'mydoc.rst':

```
~~~~~{.Bash}
Terminal> doconce format rst mydoc.do.txt
~~~~~
```

tutorial.pnd

```
~~~~~
```

We may now produce various other formats:

```
~~~~~{.Bash}
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
~~~~~
```

The OpenOffice file 'mydoc.odt' can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. However, it is more convenient to use the program 'unovonv' to convert between the many formats OpenOffice supports *on the command line*. Run

```
~~~~~{.Bash}
Terminal> unoconv --show
~~~~~
```

to see all the formats that are supported. For example, the following commands take 'mydoc.odt' to Microsoft Office Open XML format, classic MS Word format, and PDF:

```
~~~~~{.Bash}
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
~~~~~
```

Remark about Mathematical Typesetting. At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the "MS Word world". Mathematics is only fully supported by 'latex' as output and to a wide extent also supported by the 'sphinx' output format. Some links for going from LaTeX to Word are listed below.

- * <<http://ubuntuforums.org/showthread.php?t=1033441>>
- * <<http://tug.org/utilities/texconv/textopc.html>>
- * <<http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>>

Sphinx

```
-----
```

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the 'doconce sphinx_dir' command:

```
~~~~~{.Bash}
Terminal> doconce sphinx_dir author="authors' names" \
          title="some title" version=1.0 dirname=sphinx_dir \
          theme=mytheme file1 file2 file3 ...
~~~~~
```

” **tutorial.pnd** ”

The keywords `'author'`, `'title'`, and `'version'` are used in the headings of the Sphinx document. By default, `'version'` is 1.0 and the script will try to deduce authors and title from the doconce files `'file1'`, `'file2'`, etc. that together represent the whole document. Note that none of the individual Doconce files `'file1'`, `'file2'`, etc. should include the rest as their union makes up the whole document. The default value of `'dirname'` is `'sphinx-rootdir'`. The `'theme'` keyword is used to set the theme for design of HTML output from Sphinx (the default theme is `'default'`).

With a single-file document in `'mydoc.do.txt'` one often just runs

```
~~~~~{.Bash}
Terminal> doconce sphinx_dir mydoc
~~~~~
```

and then an appropriate Sphinx directory `'sphinx-rootdir'` is made with relevant files.

The `'doconce sphinx_dir'` command generates a script `'automake-sphinx.py'` for compiling the Sphinx document into an HTML document. One can either run `'automake-sphinx.py'` or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The `'doconce sphinx_dir'` script copies directories named `'figs'` or `'figures'` over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `'automake-sphinx.py'` must be edited accordingly. Links to local files (not `'http:'` or `'file:'` URLs) must be placed in the `'_static'` subdirectory of the Sphinx directory. The utility `'doconce sphinxfix_localURLs'` is run to check for local links: for each such link, say `'dir1/dir2/myfile.txt'` it replaces the link by `'_static/myfile.txt'` and copies `'dir1/dir2/myfile.txt'` to a local `'_static'` directory (in the same directory as the script is run). The user must copy all `'_static/*'` files to the `'_static'` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `'_static'` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `'_static'` directory and link to these directly from the Doconce document – then links do not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `'conf.py'` configuration file for Sphinx is edited accordingly, and a script `'make-themes.sh'` can make HTML documents with one or more themes. For example, to realize the themes `'fenics'` and `'pyramid'`, one writes

```
~~~~~{.Bash}
Terminal> ./make-themes.sh fenics pyramid
~~~~~
```

The resulting directories with HTML documents are `'_build/html_fenics'` and `'_build/html_pyramid'`, respectively. Without arguments,

tutorial.pnd

'make-themes.sh' makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file 'mydoc.do.txt'.

Step 1. Translate Doconce into the Sphinx format:

```
~~~~~{.Bash}
Terminal> doconce format sphinx mydoc
~~~~~
```

Step 2. Create a Sphinx root directory either manually or by using the interactive 'sphinx-quickstart' program. Here is a scripted version of the steps with the latter:

```
~~~~~{.Bash}
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
EOF
~~~~~
```

The autogenerated 'conf.py' file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The 'doconce sphinx_dir' generator makes an extended 'conv.py' file where, among other things, several useful Sphinx extensions are included.

Step 3. Copy the 'mydoc.rst' file to the Sphinx root directory:

```
~~~~~{.Bash}
Terminal> cp mydoc.rst sphinx-rootdir
~~~~~
```

If you have figures in your document, the relative paths to those will be invalid when you work with 'mydoc.rst' in the 'sphinx-rootdir'

” **tutorial.pnd** ”

directory. Either edit 'mydoc.rst' so that figure file paths are correct, or simply copy your figure directories to 'sphinx-rootdir'. Links to local files in 'mydoc.rst' must be modified to links to files in the '_static' directory, see comment above.

Step 4. Edit the generated 'index.rst' file so that 'mydoc.rst' is included, i.e., add 'mydoc' to the 'toctree' section so that it becomes

```
~~~~~
.. toctree::
    :maxdepth: 2

    mydoc
~~~~~
```

(The spaces before 'mydoc' are important!)

Step 5. Generate, for instance, an HTML version of the Sphinx source:

```
~~~~~{.Bash}
make clean    # remove old versions
make html
~~~~~
```

Sphinx can generate a range of different formats:

standalone HTML, HTML in separate directories with 'index.html' files, a large single HTML file, JSON files, various help files (the qthelp, HTML, and Devhelp projects), epub, LaTeX, PDF (via LaTeX), pure text, man pages, and Texinfo files.

Step 6. View the result:

```
~~~~~{.Bash}
Terminal> firefox _build/html/index.html
~~~~~
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows '!bc': 'cod' gives Python ('code-block:: python' in Sphinx syntax) and 'cppcod' gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by Google Code (<http://code.google.com/p/support/wiki/WikiSyntax>). The transformation to this format, called 'gwiki' to explicitly mark it as the Google Code dialect, is done by

```
~~~~~{.Bash}
Terminal> doconce format gwiki mydoc.do.txt
~~~~~
```

You can then open a new wiki page for your Google Code project, copy the 'mydoc.gwiki' output file from 'doconce format' and paste the file contents into the wiki page. Press Preview or Save Page to

tutorial.pnd

see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `'make.sh'` files in `'docs/manual'` and `'docs/tutorial'` constitute comprehensive examples on how such scripts can be made.

Demos

The current text is generated from a Doconce format stored in the file

```
~~~~~
docs/tutorial/tutorial.do.txt
~~~~~
```

The file `'make.sh'` in the `'tutorial'` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `'tutorial.do.txt'` is the starting point. Running `'make.sh'` and studying the various generated files and comparing them with the original `'tutorial.do.txt'` file, gives a quick introduction to how Doconce is used in a real case. [Here](<https://doconce.googlecode.com/hg/doc/demos/tutorial/index.html>) is a sample of how this tutorial looks in different formats.

There is another demo in the `'docs/manual'` directory which translates the more comprehensive documentation, `'manual.do.txt'`, to various formats. The `'make.sh'` script runs a set of translations.

Dependencies and Installation

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial (`'hg'`) source follows the standard procedure:

```
~~~~~{.Bash}
# Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
cd ..
```

tutorial.pnd

~~~~~

If you make use of the [Preprocess](<http://code.google.com/p/preprocess>) preprocessor, this program must be installed:

```
~~~~~{.Bash}
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
~~~~~
```

A much more advanced alternative to Preprocess is [Mako](<http://www.makotemplates.org>). Its installation is most conveniently done by 'pip',

```
~~~~~{.Bash}
pip install Mako
~~~~~
```

This command requires 'pip' to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by

```
~~~~~{.Bash}
sudo apt-get install python-pip
~~~~~
```

Alternatively, one can install from the 'pip' [source code](<http://pypi.python.org/pypi/pip>).

To make LaTeX documents (without going through the reStructuredText format) you need [ptex2tex](<http://code.google.com/p/ptex2tex>), which is installed by

```
~~~~~{.Bash}
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../..
~~~~~
```

As seen, 'cp2texmf.sh' copies some special stylefiles that that 'ptex2tex' potentially makes use of. Some more standard stylefiles are also needed. These are installed by

```
~~~~~{.Bash}
sudo apt-get install texlive-latex-extra
~~~~~
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the '~/texmf/tex/latex/misc' directory).

The \*minted\* LaTeX style is offered by 'ptex2tex' and popular among

” **tutorial.pnd** ”

users. This style requires the package [Pygments](<http://pygments.org>):

```
~~~~~{.Bash}
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
~~~~~
```

If you use the minted style, you have to enable it by running  
'ptex2tex -DMINTED' and then 'latex -shell-escape', see  
the the section [From Doconce to Other Formats](#s).

For 'rst' output and further transformation to LaTeX, HTML, XML,  
OpenOffice, and so on, one needs [docutils](<http://docutils.sourceforge.net>).  
The installation can be done by

```
~~~~~{.Bash}
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..
~~~~~
```

To use the OpenOffice suite you will typically on Debian systems install

```
~~~~~{.Bash}
sudo apt-get install unovonv libreoffice libreoffice-dmaths
~~~~~
```

There is a possibility to create PDF files from reST documents  
using ReportLab instead of LaTeX. The enabling software is  
[rst2pdf](<http://code.google.com/p/rst2pdf>). Either download the tarball  
or clone the svn repository, go to the 'rst2pdf' directory and  
run 'sudo python setup.py install'.

Output to 'sphinx' requires of course [Sphinx](<http://sphinx.pocoo.org>),  
installed by

```
~~~~~{.Bash}
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
~~~~~
```

When the output format is 'epydoc' one needs that program too, installed  
by

```
~~~~~{.Bash}
svn co https://epydoc.svn.sourceforge.net/svnroot/epydoc/trunk/epydoc epydoc
cd epydoc
sudo make install
cd ..
~~~~~
```



”

**tutorial.pnd**

”

Finally, translation to 'pandoc' requires the  
[Pandoc](<http://johnmacfarlane.net/pandoc/>) program  
(written in Haskell) to be installed.

```
~~~~~{.Bash}  
sudo apt-get install pandoc
~~~~~
```

*\*Remark.\** Several of the packages above installed from source code are also available in Debian-based system through the 'apt-get install' command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For 'svn' directories, go to the directory, run 'svn update', and then 'sudo python setup.py install'. For Mercurial ('hg') directories, go to the directory, run 'hg pull; hg update', and then 'sudo python setup.py install'. Do once itself is frequently updated so these commands should be run regularly.

---

# **Doconce: Document Once, Include Anywhere Documentation**

***Release 1.0***

**Hans Petter Langtangen**

February 27, 2012



# CONTENTS

|          |                                                                           |           |
|----------|---------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>Doconce: Document Once, Include Anywhere</b>                           | <b>3</b>  |
| <b>2</b> | <b>The Doconce Concept</b>                                                | <b>5</b>  |
| <b>3</b> | <b>What Does Doconce Look Like?</b>                                       | <b>7</b>  |
| 3.1      | A Subsection with Sample Text . . . . .                                   | 8         |
| 3.2      | Mathematics and Computer Code . . . . .                                   | 9         |
| 3.3      | Macros (Newcommands), Cross-References, Index, and Bibliography . . . . . | 10        |
| <b>4</b> | <b>From Doconce to Other Formats</b>                                      | <b>11</b> |
| 4.1      | HTML . . . . .                                                            | 11        |
| 4.2      | Pandoc . . . . .                                                          | 11        |
| 4.3      | LaTeX . . . . .                                                           | 12        |
| 4.4      | Plain ASCII Text . . . . .                                                | 13        |
| 4.5      | reStructuredText . . . . .                                                | 13        |
| 4.6      | Sphinx . . . . .                                                          | 14        |
| 4.7      | Google Code Wiki . . . . .                                                | 16        |
| 4.8      | Tweaking the Doconce Output . . . . .                                     | 16        |
| 4.9      | Demos . . . . .                                                           | 16        |
| 4.10     | Dependencies and Installation . . . . .                                   | 17        |
| <b>5</b> | <b>Indices and tables</b>                                                 | <b>19</b> |



Contents:



# DOCONCE: DOCUMENT ONCE, INCLUDE ANYWHERE

**Author** Hans Petter Langtangen

**Date** Feb 27, 2012

- When writing a note, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?
- Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like LaTeX, HTML, reStructuredText, Sphinx, and wiki? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?
- Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?

If any of these questions are of interest, you should keep on reading.





# THE DOCONCE CONCEPT

Doconce is two things:

1. Doconce is a very simple and minimally tagged markup language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via `rst2*` programs) go to XML, HTML, LaTeX, PDF, OpenOffice, and from the latter (via `unoconv`) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.
2. Doconce is a working strategy for never duplicating information. Text is written in a single place and then transformed to a number of different destinations of diverse type (software source code, manuals, tutorials, books, wikis, memos, emails, etc.). The Doconce markup language support this working strategy. The slogan is: “Write once, include anywhere”.

Here are some Doconce features:

- Doconce markup does include tags, so the format is more tagged than Markdown and Pandoc, but less than reST, and very much less than LaTeX and HTML.
- Doconce can be converted to plain *untagged* text, often desirable for computer programs and email.
- Doconce has good support for copying in parts of computer code, say in examples, directly from the source code files.
- Doconce has full support for LaTeX math, and integrates very well with big LaTeX projects (books).
- Doconce is almost self-explanatory and is a handy starting point for generating documents in more complicated markup languages, such as Google wiki, LaTeX, and Sphinx. A primary application of Doconce is just to make the initial versions of a Sphinx or wiki document.
- Contrary to the similar Pandoc translator, Doconce integrates with Sphinx and Google wiki. However, if these formats are not of interest, Pandoc is obviously a superior tool.

Doconce was particularly written for the following sample applications:

- Large books written in LaTeX, but where many pieces (computer demos, projects, examples) can be written in Doconce to appear in other contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.
- Software documentation, primarily Python doc strings, which one wants to appear as plain untagged text for viewing in Pydoc, as reStructuredText for use with Sphinx, as wiki text when publishing the software at web sites, and as LaTeX integrated in, e.g., a thesis.
- Quick memos, which start as plain text in email, then some small amount of Doconce tagging is added, before the memos can appear as Sphinx web pages, MS Word documents, or in wikis.

History: Doconce was developed in 2006 at a time when most popular markup languages used quite some tagging. Later, almost untagged markup languages like Markdown and Pandoc became popular. Doconce is not a replacement of Pandoc, which is a considerably more sophisticated project. Moreover, Doconce was developed mainly to fulfill the needs for a flexible source code base for books with much mathematics and computer code.

Disclaimer: Doconce is a simple tool, largely based on interpreting and handling text through regular expressions. The possibility for tweaking the layout is obviously limited since the text can go to all sorts of sophisticated markup languages. Moreover, because of limitations of regular expressions, some formatting of Doconce syntax may face problems when transformed to HTML, LaTeX, Sphinx, and similar formats.

# WHAT DOES DOCONCE LOOK LIKE?

Doconce text looks like ordinary text, but there are some almost invisible text constructions that allow you to control the formatting. Here are some examples.

- Bullet lists arise from lines starting with an asterisk.
- *Emphasized words* are surrounded by asterisks.
- **Words in boldface** are surrounded by underscores.
- Words from computer code are enclosed in back quotes and then typeset `verbatim` (in a monospace font).
- Section headings are recognized by equality (=) signs before and after the title, and the number of = signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- Paragraph headings are recognized by a double underscore before and after the heading.
- The abstract of a document starts with *Abstract* as paragraph heading, and all text up to the next heading makes up the abstract,
- Blocks of computer code can easily be included by placing `!bc` (begin code) and `!ec` (end code) commands at separate lines before and after the code block.
- Blocks of computer code can also be imported from source files.
- Blocks of LaTeX mathematics can easily be included by placing `!bt` (begin TeX) and `!et` (end TeX) commands at separate lines before and after the math block.
- There is support for both LaTeX and text-like inline mathematics.
- Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- Invisible comments in the output format can be inserted throughout the text (# at the beginning of a line).
- Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- There is special support for advanced exercises features.
- With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```
===== A Subsection with Sample Text =====  
label{my:first:sec}
```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and ``computer`` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1
- o item 2
- o item 3

URLs with a link word are possible, as in `"hpl":"http://folk.uio.no/hpl"`. If the word is URL, the URL itself becomes the link name, as in `"URL":"tutorial.do.txt"`.

References to sections may use logical names as labels (e.g., a `"label"` command right after the section title), as in the reference to `Section ref{my:first:sec}`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see `Section ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

```
|-----|
|time   | velocity | acceleration |
|---r---r-----r-----|
| 0.0   | 1.4186   | -5.01        |
| 2.0   | 1.376512 | 11.919       |
| 4.0   | 1.1E+1   | 14.717624    |
|-----|
```

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

### 3.1 A Subsection with Sample Text

Ordinary text looks like ordinary text, and the tags used for **boldface** words, *emphasized* words, and `computer` words look natural in plain text. Lists are typeset as you would do in an email,

- item 1
- item 2
- item 3

Lists can also have numbered items instead of bullets, just use an `o` (for ordered) instead of the asterisk:

1. item 1
2. item 2
3. item 3

URLs with a link word are possible, as in [hpl](#). If the word is URL, the URL itself becomes the link name, as in [tutorial.do.txt](#).

References to sections may use logical names as labels (e.g., a “label” command right after the section title), as in the reference to the section [A Subsection with Sample Text](#).

Doconce also allows inline comments such as (**hpl**: here I will make some remarks to the text) for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see the section [From Doconce to Other Formats](#) for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

## 3.2 Mathematics and Computer Code

Inline mathematics, such as  $\nu = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $\nu = \sin(x)$  is typeset as

`$\nu = \sin(x)$` | `$v = \sin(x)$`

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `!bt` and `!et` (begin tex / end tex) instructions. The result looks like this:

$$\begin{aligned}\frac{\partial u}{\partial t} &= \nabla^2 u + f, \\ \frac{\partial v}{\partial t} &= \nabla \cdot (q(u) \nabla v) + g\end{aligned}\tag{3.1}$$

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `!bc` and `!ec` instructions, respectively. Such blocks look like

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to `sphinx`, `rst`, and ASCII-close formats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `!bc xxx` where `xxx` is an identifier like `pycod` for code snippet in Python, `sys` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `ptex2tex` and defined in a configuration file `.ptext2tex.cfg`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), `pl` (Perl), `m` (Matlab), `sh` (Unix shells), `cy` (Cython), and `py` (Python).

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing enviroment for plain text.

### 3.3 Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style *newcommand* construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files *must* appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `doc/manual/manual.do.txt` file (see the [demo page](#) for various formats of this document).

# FROM DOCONCE TO OTHER FORMATS

Transformation of a Doconce document `mydoc.do.txt` to various other formats applies the script `doconce` format:

```
Terminal> doconce format format mydoc.do.txt
```

or just

```
Terminal> doconce format format mydoc
```

The `mako` or `preprocess` programs are always used to preprocess the file first, and options to `mako` or `preprocess` can be added after the filename. For example,

```
Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5      # preprocess
Terminal> doconce format latex yourdoc extra_sections=True VAR1=5  # mako
```

The variable `FORMAT` is always defined as the current format when running `preprocess`. That is, in the last example, `FORMAT` is defined as `latex`. Inside the Doconce document one can then perform format specific actions through tests like `#if FORMAT == "latex"`.

Inline comments in the text are removed from the output by

```
Terminal> doconce format latex mydoc --skip_inline_comments
```

One can also remove all such comments from the original Doconce file by running:

```
Terminal> doconce remove_inline_comments mydoc
```

This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.

## 4.1 HTML

Making an HTML version of a Doconce file `mydoc.do.txt` is performed by

```
Terminal> doconce format html mydoc
```

The resulting file `mydoc.html` can be loaded into any web browser for viewing.

## 4.2 Pandoc

Output in the versatile Pandoc format results from



```
Terminal> doconce format pandoc mydoc
```

The name of the output file is `mydoc.pnd`. From this format one can go to numerous other formats:

```
Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd
Terminal> pandoc -R -t mediawiki -o mydoc.mwk mydoc.pnd
```

Pandoc supports latex, html, odt (OpenOffice), docx (Microsoft Word), rtf, texinfo, to mention some. The `-R` option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the [Pandoc documentation](#) for the many features of the pandoc program.

## 4.3 LaTeX

Making a LaTeX file `mydoc.tex` from `mydoc.do.txt` is done in two steps: .. Note: putting code blocks inside a list is not successful in many

**Step 1. Filter the doconce text to a pre-LaTeX form `mydoc.p.tex` for `ptex2tex`:**

```
Terminal> doconce format latex mydoc
```

LaTeX-specific commands (“newcommands”) in math formulas and similar can be placed in files `newcommands.tex`, `newcommands_keep.tex`, or `newcommands_replace.tex` (see the section *Macros (Newcommands), Cross-References, Index, and Bibliography*). If these files are present, they are included in the LaTeX document so that your commands are defined.

**Step 2. Run `ptex2tex` (if you have it) to make a standard LaTeX file,**

```
Terminal> ptex2tex mydoc
```

or just perform a plain copy,

```
Terminal> cp mydoc.p.tex mydoc.tex
```

Doconce generates a `.p.tex` file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run

```
Terminal> ptex2tex -DHELVETICA mydoc
```

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX “maketitle” heading is also available through

```
Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc
```

A separate titlepage can be generate by

```
Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc
```

The `ptex2tex` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `!bc` command in the Doconce source you can insert verbatim block styles as defined in your `.ptex2tex.cfg` file, e.g., `!bc cod` for a code snippet, where `cod` is set to a certain environment in `.ptex2tex.cfg` (e.g., `CodeIntended`). There are over 30 styles to choose from.

**Step 3. Compile `mydoc.tex` and create the PDF file:**

```
Terminal> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
```

```
Terminal> latex mydoc
Terminal> dvipdf mydoc
```

If one wishes to use the `Minted_Python`, `Minted_Cpp`, etc., environments in `ptex2tex` for typesetting code, the `minted` LaTeX package is needed. This package is included by running `doconce format` with the `-DMINTED` option:

```
Terminal> ptex2tex -DMINTED mydoc
```

In this case, `latex` must be run with the `-shell-escape` option:

```
Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc # if index
Terminal> bibitem mydoc # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc
```

The `-shell-escape` option is required because the `minted.sty` style file runs the `pygments` program to format code, and this program cannot be run from `latex` without the `-shell-escape` option.

## 4.4 Plain ASCII Text

We can go from Doconce “back to” plain untagged text suitable for viewing in terminal windows, inclusion in email text, or for insertion in computer source code:

```
Terminal> doconce format plain mydoc.do.txt # results in mydoc.txt
```

## 4.5 reStructuredText

Going from Doconce to `reStructuredText` gives a lot of possibilities to go to other formats. First we filter the Doconce text to a `reStructuredText` file `mydoc.rst`:

```
Terminal> doconce format rst mydoc.do.txt
```

We may now produce various other formats:

```
Terminal> rst2html.py mydoc.rst > mydoc.html # html
Terminal> rst2latex.py mydoc.rst > mydoc.tex # latex
Terminal> rst2xml.py mydoc.rst > mydoc.xml # XML
Terminal> rst2odt.py mydoc.rst > mydoc.odt # OpenOffice
```

The OpenOffice file `mydoc.odt` can be loaded into OpenOffice and saved in, among other things, the RTF format or the Microsoft Word format. However, it is more convenient to use the program `unoconv` to convert between the many formats OpenOffice supports *on the command line*. Run

```
Terminal> unoconv --show
```

to see all the formats that are supported. For example, the following commands take `mydoc.odt` to Microsoft Office Open XML format, classic MS Word format, and PDF:

```
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt
```

*Remark about Mathematical Typesetting.* At the time of this writing, there is no easy way to go from Doconce and LaTeX mathematics to reST and further to OpenOffice and the “MS Word world”. Mathematics is only fully supported by latex as output and to a wide extent also supported by the sphinx output format. Some links for going from LaTeX to Word are listed below.

- <http://ubuntuforums.org/showthread.php?t=1033441>
- <http://tug.org/utilities/texconv/textopc.html>
- <http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html>

## 4.6 Sphinx

Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the `doconce sphinx_dir` command:

```
Terminal> doconce sphinx_dir author="authors' names" \
          title="some title" version=1.0 dirname=sphinx_dir \
          theme=mytheme file1 file2 file3 ...
```

The keywords `author`, `title`, and `version` are used in the headings of the Sphinx document. By default, `version` is 1.0 and the script will try to deduce authors and title from the doconce files `file1`, `file2`, etc. that together represent the whole document. Note that none of the individual Doconce files `file1`, `file2`, etc. should include the rest as their union makes up the whole document. The default value of `dirname` is `sphinx-rootdir`. The theme keyword is used to set the theme for design of HTML output from Sphinx (the default theme is ‘default’).

With a single-file document in `mydoc.do.txt` one often just runs

```
Terminal> doconce sphinx_dir mydoc
```

and then an appropriate Sphinx directory `sphinx-rootdir` is made with relevant files.

The `doconce sphinx_dir` command generates a script `automake-sphinx.py` for compiling the Sphinx document into an HTML document. One can either run `automake-sphinx.py` or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.

The `doconce sphinx_dir` script copies directories named `figs` or `figures` over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `automake-sphinx.py` must be edited accordingly. Links to local files (not `http:` or `file:` URLs) must be placed in the `_static` subdirectory of the Sphinx directory. The utility `doconce sphinxfix_localURLs` is run to check for local links: for each such link, say `dir1/dir2/myfile.txt` it replaces the link by `_static/myfile.txt` and copies `dir1/dir2/myfile.txt` to a local `_static` directory (in the same directory as the script is run). The user must copy all `_static/*` files to the `_static` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `_static` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `_static` directory and link to these directly from the Doconce document - then links do not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `conf.py` configuration file for Sphinx is edited accordingly, and a script `make-themes.sh` can make HTML documents with one or more themes. For example, to realize the themes `fenics` and `pyramid`, one writes

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are `_build/html_fenics` and `_build/html_pyramid`, respectively. Without arguments, `make-themes.sh` makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file `mydoc.do.txt`.

*Step 1.* Translate Doconce into the Sphinx format:

```
Terminal> doconce format sphinx mydoc
```

*Step 2.* Create a Sphinx root directory either manually or by using the interactive `sphinx-quickstart` program. Here is a scripted version of the steps with the latter:

```
mkdir sphinx-rootdir
sphinx-quickstart <<EOF
sphinx-rootdir
n
—
Name of My Sphinx Document
Author
version
version
.rst
index
n
Y
n
n
n
n
Y
n
n
Y
Y
Y
Y
EOF
```

The autogenerated `conf.py` file may need some edits if you want to specific layout (Sphinx themes) of HTML pages. The `doconce sphinx_dir` generator makes an extended `conf.py` file where, among other things, several useful Sphinx extensions are included.

*Step 3.* Copy the `mydoc.rst` file to the Sphinx root directory:

```
Terminal> cp mydoc.rst sphinx-rootdir
```

If you have figures in your document, the relative paths to those will be invalid when you work with `mydoc.rst` in the `sphinx-rootdir` directory. Either edit `mydoc.rst` so that figure file paths are correct, or simply copy your figure directories to `sphinx-rootdir`. Links to local files in `mydoc.rst` must be modified to links to files in the `_static` directory, see comment above.

*Step 4.* Edit the generated `index.rst` file so that `mydoc.rst` is included, i.e., add `mydoc` to the `toctree` section so that it becomes

```
.. toctree::
   :maxdepth: 2

   mydoc
```

(The spaces before `mydoc` are important!)

*Step 5.* Generate, for instance, an HTML version of the Sphinx source:

```
make clean    # remove old versions
make html
```

Sphinx can generate a range of different formats: standalone HTML, HTML in separate directories with `index.html` files, a large single HTML file, JSON files, various help files (the qthelp, HTML, and Devhelp projects), epub, LaTeX, PDF (via LaTeX), pure text, man pages, and Texinfo files.

*Step 6.* View the result:

```
Terminal> firefox _build/html/index.html
```

Note that verbatim code blocks can be typeset in a variety of ways depending the argument that follows `!bc`: `cod` gives Python (`code-block:: python` in Sphinx syntax) and `cppcod` gives C++, but all such arguments can be customized both for Sphinx and LaTeX output.

## 4.7 Google Code Wiki

There are several different wiki dialects, but Doconce only support the one used by [Google Code](#). The transformation to this format, called `gwiki` to explicitly mark it as the Google Code dialect, is done by

```
Terminal> doconce format gwiki mydoc.do.txt
```

You can then open a new wiki page for your Google Code project, copy the `mydoc.gwiki` output file from `doconce format` and paste the file contents into the wiki page. Press **Preview** or **Save Page** to see the formatted result.

When the Doconce file contains figures, each figure filename must be replaced by a URL where the figure is available. There are instructions in the file for doing this. Usually, one performs this substitution automatically (see next section).

## 4.8 Tweaking the Doconce Output

Occasionally, one would like to tweak the output in a certain format from Doconce. One example is figure filenames when transforming Doconce to reStructuredText. Since Doconce does not know if the `.rst` file is going to be filtered to LaTeX or HTML, it cannot know if `.eps` or `.png` is the most appropriate image filename. The solution is to use a text substitution command or code with, e.g., `sed`, `perl`, `python`, or `scitools subst`, to automatically edit the output file from Doconce. It is then wise to run Doconce and the editing commands from a script to automate all steps in going from Doconce to the final format(s). The `make.sh` files in `docs/manual` and `docs/tutorial` constitute comprehensive examples on how such scripts can be made.

## 4.9 Demos

The current text is generated from a Doconce format stored in the file

```
docs/tutorial/tutorial.do.txt
```

The file `make.sh` in the `tutorial` directory of the Doconce source code contains a demo of how to produce a variety of formats. The source of this tutorial, `tutorial.do.txt` is the starting point. Running `make.sh` and studying the various generated files and comparing them with the original `tutorial.do.txt` file, gives a quick introduction to how Doconce is used in a real case. [Here](#) is a sample of how this tutorial looks in different formats.

There is another demo in the `docs/manual` directory which translates the more comprehensive documentation, `manual.do.txt`, to various formats. The `make.sh` script runs a set of translations.

## 4.10 Dependencies and Installation

Doconce itself is pure Python code hosted at <http://code.google.com/p/doconce>. Its installation from the Mercurial (hg) source follows the standard procedure:

```
# Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install
cd ..
```

If you make use of the [Preprocess](#) preprocessor, this program must be installed:

```
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ..
```

A much more advanced alternative to Preprocess is [Mako](#). Its installation is most conveniently done by pip,

```
pip install Mako
```

This command requires pip to be installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by

```
sudo apt-get install python-pip
```

Alternatively, one can install from the [pip source code](#).

To make LaTeX documents (without going through the reStructuredText format) you need [ptex2tex](#), which is installed by

```
svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../../
```

As seen, `cp2texmf.sh` copies some special stylefiles that that `ptex2tex` potentially makes use of. Some more standard stylefiles are also needed. These are installed by

```
sudo apt-get install texlive-latex-extra
```

on Debian Linux (including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by googling and installed manually in the `~/texmf/tex/latex/misc` directory).

The *minted* LaTeX style is offered by `ptex2tex` and popular among users. This style requires the package [Pygments](#):

```
hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install
```

If you use the *minted* style, you have to enable it by running `ptex2tex -DMINTED` and then `latex -shell-escape`, see the the section [From Doconce to Other Formats](#).

For `rst` output and further transformation to LaTeX, HTML, XML, OpenOffice, and so on, one needs [docutils](#). The installation can be done by

```
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..
```

To use the OpenOffice suite you will typically on Debian systems install

```
sudo apt-get install unovonv libreoffice libreoffice-dmaths
```

There is a possibility to create PDF files from reST documents using ReportLab instead of LaTeX. The enabling software is [rst2pdf](#). Either download the tarball or clone the svn repository, go to the `rst2pdf` directory and run `sudo python setup.py install`.

Output to sphinx requires of course [Sphinx](#), installed by

```
hg clone https://bitbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..
```

When the output format is epydoc one needs that program too, installed by

```
svn co https://epydock.svn.sourceforge.net/svnroot/epydock/trunk/epydock epydoc
cd epydoc
sudo make install
cd ..
```

Finally, translation to pandoc requires the [Pandoc](#) program (written in Haskell) to be installed.

```
sudo apt-get install pandoc
```

*Remark.* Several of the packages above installed from source code are also available in Debian-based system through the `apt-get install` command. However, we recommend installation directly from the version control system repository as there might be important updates and bug fixes. For `svn` directories, go to the directory, run `svn update`, and then `sudo python setup.py install`. For Mercurial (`hg`) directories, go to the directory, run `hg pull`; `hg update`, and then `sudo python setup.py install`. Doconce itself is frequently updated so these commands should be run regularly.

# INDICES AND TABLES

- *genindex*
- *modindex*
- *search*



| " | tutorial.xml                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | " |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|   | <pre> &lt;?xml version="1.0" encoding="utf-8"?&gt; &lt;!DOCTYPE document PUBLIC "-//IDN docutils.sourceforge.net//DTD Docutils Generic //EN//XML" "http://docutils.sourceforge.net/docs/ref/docutils.dtd"&gt; &lt;!-- Generated by Docutils 0.9 --&gt; &lt;document source="tutorial.rst"&gt;&lt;comment xml:space="preserve"&gt;Automatically gene rated reST file from Doconce source (http://code.google.com/p/doconce/)&lt;/comment&gt;&lt;section ids="doconce-document-once -include-anywhere" names="doconce:\ document\ once,\ include\ anywhere"&gt;&lt;title&gt;D oconce: Document Once, Include Anywhere&lt;/title&gt;&lt;field_list&gt;&lt;field&gt;&lt;field_name&gt;Au thor&lt;/field_name&gt;&lt;field_body&gt;&lt;paragraph&gt;Hans Petter Langtangen&lt;/paragraph&gt;&lt;/fiel d_body&gt;&lt;/field&gt;&lt;field&gt;&lt;field_name&gt;Date&lt;/field_name&gt;&lt;field_body&gt;&lt;paragraph&gt;Feb 27 , 2012&lt;/paragraph&gt;&lt;bullet_list bullet="*"&gt;&lt;list_item&gt;&lt;paragraph&gt;When writing a n ote, report, manual, etc., do you find it difficult to choose the typesetting format? That is, to choose between plain (email-like) text, wiki, Word/OpenOffice, LaTeX, HTML, reStructuredText, Sphinx, XML, etc. Would it be convenient to start with some very simple text-like format that easily converts to the formats listed above, and then at some later stage eventually go with a particular format?&lt;/paragraph&gt;&lt;/list_item&gt;&lt;list_item&gt;&lt;parag raph&gt;Do you need to write documents in varying formats but find it difficult to remember all the typesetting details of various formats like &lt;reference name="LaTeX" refuri="http://refcards.com/docs/silvermanj /amslatex/LaTeXRefCard.v2.0.pdf"&gt;LaTeX&lt;/reference&gt;&lt;target ids="latex" names="lat ex" refuri="http://refcards.com/docs/silvermanj/amslatex/LaTeXRefCard.v2.0.pdf"/ &gt;, &lt;reference name="HTML" refuri="http://www.htmlcodetutorial.com/"&gt;HTML&lt;/refere nce&gt;&lt;target ids="html" names="html" refuri="http://www.htmlcodetutorial.com/"&gt;, &lt;reference name="reStructuredText" refuri="http://docutils.sourceforge.net/docs /ref/rst/restructuredtext.html"&gt;reStructuredText&lt;/reference&gt;&lt;target ids="restruc turedtext" names="restructuredtext" refuri="http://docutils.sourceforge.net/docs /ref/rst/restructuredtext.html"/&gt;, &lt;reference name="Sphinx" refuri="http://sphin x.pocoo.org/contents.html"&gt;Sphinx&lt;/reference&gt;&lt;target dupnames="sphinx" ids="sphi nx" refuri="http://sphinx.pocoo.org/contents.html"/&gt;, and &lt;reference name="wiki" refuri="http://code.google.com/p/support/wiki/WikiSyntax"&gt;wiki&lt;/reference&gt;&lt;targ et ids="wiki" names="wiki" refuri="http://code.google.com/p/support/wiki/WikiSyn tax"/&gt;? Would it be convenient to generate the typesetting details of a particular format from a very simple text-like format with minimal tagging?&lt;/paragraph&gt;&lt;/list_item&gt;&lt;list_ item&gt;&lt;paragraph&gt;Do you have the same information scattered around in different documents in different typesetting formats? Would it be a good idea to write things once, in one format, stored in one place, and include it anywhere?&lt;/paragraph&gt;&lt;/list_item&gt;&lt;/bullet_list&gt;&lt;/field_body&gt;&lt;/field&gt;&lt; /field_list&gt;&lt;paragraph&gt;If any of these questions are of interest, you should kee p on reading.&lt;/paragraph&gt;&lt;/section&gt;&lt;section ids="the-doconce-concept" names="the \ doconce\ concept"&gt;&lt;title&gt;The Doconce Concept&lt;/title&gt;&lt;paragraph&gt;Doconce is two things:&lt;/paragraph&gt;&lt;block_quote&gt;&lt;enumerated_list enumtype="arabic" prefix="" suf fix="."&gt;&lt;list_item&gt;&lt;paragraph&gt;Doconce is a very simple and minimally tagged mark up language that looks like ordinary ASCII text (much like what you would use in an email), but the text can be transformed to numerous other formats, including HTML, Pandoc, Google wiki, LaTeX, PDF, reStructuredText (reST), Sphinx, Epytext, and also plain text (where non-obvious formatting/tags are removed for clear reading in, e.g., emails). From reST you can (via &lt;literal&gt;rst2*&lt;/literal&gt; programs) go to XML, HT ML, LaTeX, PDF, OpenOffice, and from the latter (via &lt;literal&gt;unoconv&lt;/literal&gt;) to RTF, numerous MS Word formats (including MS Office Open XML), DocBook, PDF, MediaWiki, XHTML. From Pandoc one can generate Markdown, reST, LaTeX, HTML, PDF, DocBook XML, OpenOffice, GNU Texinfo, MediaWiki, RTF, Groff, and other formats.&lt;/paragraph&gt;&lt;/list_item&gt;&lt;list_ </pre> |   |

## tutorial.xml

```

item><paragraph>Doconce is a working strategy for never duplicating information.
Text is written in a single place and then transformed to
a number of different destinations of diverse type (software
source code, manuals, tutorials, books, wikis, memos, emails, etc.).
The Doconce markup language support this working strategy.
The slogan is: &quot;Write once, include anywhere&quot;.</paragraph></list_item>
</enumerated_list></block_quote><paragraph>Here are some Doconce features:</para
graph><block_quote><bullet_list bullet="*"><list_item><paragraph>Doconce markup
does include tags, so the format is more tagged than
Markdown and Pandoc, but less than reST, and very much less than
LaTeX and HTML.</paragraph></list_item><list_item><paragraph>Doconce can be conv
erted to plain <emphasis>untagged</emphasis> text,
often desirable for computer programs and email.</paragraph></list_item><list_it
em><paragraph>Doconce has good support for copying in parts of computer code,
say in examples, directly from the source code files.</paragraph></list_item><li
st_item><paragraph>Doconce has full support for LaTeX math, and integrates very
well
with big LaTeX projects (books).</paragraph></list_item><list_item><paragraph>Do
conce is almost self-explanatory and is a handy starting point
for generating documents in more complicated markup languages, such
as Google wiki, LaTeX, and Sphinx. A primary application of Doconce
is just to make the initial versions of a Sphinx or wiki document.</paragraph></
list_item><list_item><paragraph>Contrary to the similar Pandoc translator, Docon
ce integrates with
Sphinx and Google wiki. However, if these formats are not of interest,
Pandoc is obviously a superior tool.</paragraph></list_item></bullet_list></bloc
k_quote><paragraph>Doconce was particularly written for the following sample app
lications:</paragraph><block_quote><bullet_list bullet="*"><list_item><paragraph
>Large books written in LaTeX, but where many pieces (computer demos,
projects, examples) can be written in Doconce to appear in other
contexts in other formats, including plain HTML, Sphinx, wiki, or MS Word.</para
graph></list_item><list_item><paragraph>Software documentation, primarily Python
doc strings, which one wants
to appear as plain untagged text for viewing in Pydoc, as reStructuredText
for use with Sphinx, as wiki text when publishing the software at
web sites, and as LaTeX integrated in, e.g., a thesis.</paragraph></list_item><li
st_item><paragraph>Quick memos, which start as plain text in email, then some s
mall
amount of Doconce tagging is added, before the memos can appear as
Sphinx web pages, MS Word documents, or in wikis.</paragraph></list_item></bulle
t_list></block_quote><paragraph>History: Doconce was developed in 2006 at a time
when most popular
markup languages used quite some tagging. Later, almost untagged
markup languages like Markdown and Pandoc became popular. Doconce is
not a replacement of Pandoc, which is a considerably more
sophisticated project. Moreover, Doconce was developed mainly to
fulfill the needs for a flexible source code base for books with much
mathematics and computer code.</paragraph><paragraph>Disclaimer: Doconce is a si
mple tool, largely based on interpreting
and handling text through regular expressions. The possibility for
tweaking the layout is obviously limited since the text can go to
all sorts of sophisticated markup languages. Moreover, because of
limitations of regular expressions, some formatting of Doconce syntax
may face problems when transformed to HTML, LaTeX, Sphinx, and similar
formats.</paragraph></section><section ids="what-does-doconce-look-like" names="
what\ does\ doconce\ look\ like?"><title>What Does Doconce Look Like?</title><pa
ragraph>Doconce text looks like ordinary text, but there are some almost invisib
le
text constructions that allow you to control the formating. Here are

```

## tutorial.xml

some examples.

- Bullet lists arise from lines starting with an asterisk.
- Emphasized words are surrounded by asterisks.
- Words in boldface are surrounded by underscores.
- Words from computer code are enclosed in back quotes and then typeset `verbatim` (in a monospace font).
- Section headings are recognized by equality (`=`) signs before and after the title, and the number of `=` signs indicates the level of the section: 7 for main section, 5 for subsection, and 3 for subsubsection.
- Paragraph headings are recognized by a double underscore before and after the heading.
- The abstract of a document starts with `Abstract` as paragraph heading, and all text up to the next heading makes up the abstract.
- Blocks of computer code can easily be included by placing `!bc` (begin code) and `!ec` (end code) commands at separate lines before and after the code block.
- Blocks of computer code can also be imported from source files.
- Blocks of LaTeX mathematics can easily be included by placing `!bt` (begin TeX) and `!et` (end TeX) commands at separate lines before and after the math block.
- There is support for both LaTeX and text-like inline mathematics.
- Figures and movies with captions, simple tables, URLs with links, index list, labels and references are supported.
- Invisible comments in the output format can be inserted throughout the text (`#` at the beginning of a line).
- Visible comments can be inserted so that authors and readers can comment upon the text (and at any time turn on/off output of such comments).
- There is special support for advanced exercises features.
- With a simple preprocessor, Preprocess or Mako, one can include other documents (files) and large portions of text can be defined in or out of the text.
- With the Mako preprocessor one can even embed Python code and use this to steer generation of Doconce text.

Here is an example of some simple text written in the Doconce format:

```

=====
A Subsection with Sample Text =====
label{my:first:sec}

```

Ordinary text looks like ordinary text, and the tags used for `_boldface_` words, `*emphasized*` words, and `'computer'` words look natural in plain text. Lists are typeset as you would do in an email,

- \* item 1
- \* item 2
- \* item 3

Lists can also have automatically numbered items instead of bullets,

- o item 1

## tutorial.xml

- o item 2
- o item 3

URLs with a link word are possible, as in `<hpl>http://folk.uio.no/hpl</hpl>`. If the word is URL, the URL itself becomes the link name, as in `<URL>tutorial.do.txt</URL>`.

References to sections may use logical names as labels (e.g., a `<label>` command right after the section title), as in the reference to Section `ref{my:first:sec}`.

Doconce also allows inline comments such as `[hpl: here I will make some remarks to the text]` for allowing authors to make notes. Inline comments can be removed from the output by a command-line argument (see Section `ref{doconce2formats}` for an example).

Tables are also supported, e.g.,

| time | velocity | acceleration |
|------|----------|--------------|
| 0.0  | 1.4186   | -5.01        |
| 2.0  | 1.376512 | 11.919       |
| 4.0  | 1.1E+1   | 14.717624    |

# lines beginning with # are comment lines

The Doconce text above results in the following little document:

```
<target refid="my-first-sec">
<section ids="a-subsection-with-sample-text my-first-sec" names="a\ subsection\ with\ sample\ text my:first:sec">
<title>A Subsection with Sample Text</title>
<paragraph>Ordinary text looks like ordinary text, and the tags used for
<strong>boldface</strong> words, <emphasis>emphasized</emphasis> words, and <literal>computer</literal> words look
natural in plain text. Lists are typeset as you would do in an email,</paragraph>
<block_quote>
<bullet_list bullet="*">
<list_item><paragraph>item 1</paragraph></list_item>
<list_item><paragraph>item 2</paragraph></list_item>
<list_item><paragraph>item 3</paragraph></list_item>
</bullet_list>
</block_quote>
<paragraph>Lists can also have numbered items instead of bullets, just use an <literal>o</literal>
(for ordered) instead of the asterisk:</paragraph>
<block_quote>
<enumerated_list enumtype="arabic" prefix="" suffix=".">
<list_item><paragraph>item 1</paragraph></list_item>
<list_item><paragraph>item 2</paragraph></list_item>
<list_item><paragraph>item 3</paragraph></list_item>
</enumerated_list>
</block_quote>
<paragraph>URLs with a link word are possible, as in <reference name="hpl" refuri="http://folk.uio.no/hpl">hpl</reference>
<target ids="hpl" names="hpl" refuri="http://folk.uio.no/hpl">.
If the word is URL, the URL itself becomes the link name,
as in <reference name="tutorial.do.txt" refuri="tutorial.do.txt">tutorial.do.txt
</reference>
<target ids="tutorial-do-txt" names="tutorial.do.txt" refuri="tutorial.do.txt">.
</paragraph>
<paragraph>References to sections may use logical names as labels (e.g., a
<label> command right after the section title), as in the reference to the section
<reference name="A Subsection with Sample Text" refid="a-subsection-with-sample-text">A Subsection with Sample Text</reference>.
</paragraph>
<paragraph>Doconce also allows inline comments such as (<strong>hpl</strong>: here I will make
some remarks to the text) for allowing authors to make notes. Inline
```

## tutorial.xml

comments can be removed from the output by a command-line argument (see the section `<reference name="From Doconce to Other Formats" refid="from-doc-once-to-other-formats">From Doconce to Other Formats</reference>` for an example).

Tables are also supported, e.g.,

time	velocity	acceleration
0.0	1.4186	-5.01
2.0	1.376512	11.919
4.0	1.1E+1	14.717624

Inline mathematics, such as  $v = \sin(x)$ , allows the formula to be specified both as LaTeX and as plain text. This results in a professional LaTeX typesetting, but in other formats the text version normally looks better than raw LaTeX mathematics with backslashes. An inline formula like  $v = \sin(x)$  is typeset as:

$$\nu = \sin(x)$$

The pipe symbol acts as a delimiter between LaTeX code and the plain text version of the formula.

Blocks of mathematics are better typeset with raw LaTeX, inside `<literal>!bt</literal>` and `<literal>!et</literal>` (begin tex / end tex) instructions. The result looks like this:

$$\frac{\partial u}{\partial t} \text{ \& } \nabla^2 u + f, \text{ \& } \frac{\partial v}{\partial t} \text{ \& } \nabla \cdot (q(u) \nabla v) + g$$

Of course, such blocks only looks nice in LaTeX. The raw LaTeX syntax appears in all other formats (but can still be useful for those who can read LaTeX syntax).

You can have blocks of computer code, starting and ending with `<literal>!bc</literal>` and `<literal>!ec</literal>` instructions, respectively. Such blocks look like:

```
from math import sin, pi
def myfunc(x):
    return sin(pi*x)

import integrate
I = integrate.trapezoidal(myfunc, 0, pi, 100)
```

A code block must come after some plain sentence (at least for successful output to `<literal>sphinx</literal>`, `<literal>rst</literal>`, and ASCII-close for mats), not directly after a section/paragraph heading or a table.

It is possible to add a specification of an environment for typesetting the verbatim code block, e.g., `<literal>!bc xxx</literal>` where `<literal>xxx</literal>` is an identifier like `<literal>pycod</literal>` for code snippet in Python, `<literal>sys</literal>` for terminal session, etc. When Doconce is filtered to LaTeX, these identifiers are used as in `<literal>ptex2tex</literal>` and defined in a configuration file `<literal>.ptext2tex.cfg</literal>`, while when filtering to Sphinx, one can have a comment line in the Doconce file for mapping the identifiers to legal language names for Sphinx (which equals

## tutorial.xml

the legal language names for Pygments):

```
# sphinx code-blocks: pycod=python cod=fortran cppcod=c++ sys=console
```

By default, `pro` and `cod` are `python`, `sys` is `console`, while `xpro` and `xcod` are computer language specific for `x` in `f` (Fortran), `c` (C), `cpp` (C++), `pl` (Perl), `m` (Matlab), `sh` (Unix shells), `cy` (Cython), and `py` (Python).

(Any sphinx code-block comment, whether inside verbatim code blocks or outside, yields a mapping between bc arguments and computer languages. In case of multiple definitions, the first one is used.)

One can also copy computer code directly from files, either the complete file or specified parts. Computer code is then never duplicated in the documentation (important for the principle of avoiding copying information!). A complete file is typeset with `!bc pro`, while a part of a file is copied into a `!bc cod` environment. What `pro` and `cod` mean is then defined through a `.ptex2tex.cfg` file for LaTeX and a `sphinx code-blocks` comment for Sphinx.

Another document can be included by writing `#include "mynote.do.txt"` on a line starting with (another) hash sign. Doconce documents have extension `do.txt`. The `do` part stands for doconce, while the trailing `.txt` denotes a text document so that editors gives you the right writing environment for plain text.

## Macros (Newcommands), Cross-References, Index, and Bibliography

Doconce supports a type of macros via a LaTeX-style `<em>newcommand</em>` construction. The newcommands defined in a file with name `newcommand_replace.tex` are expanded when Doconce is filtered to other formats, except for LaTeX (since LaTeX performs the expansion itself). Newcommands in files with names `newcommands.tex` and `newcommands_keep.tex` are kept unaltered when Doconce text is filtered to other formats, except for the Sphinx format. Since Sphinx understands LaTeX math, but not newcommands if the Sphinx output is HTML, it makes most sense to expand all newcommands. Normally, a user will put all newcommands that appear in math blocks surrounded by `!bt` and `!et` in `newcommands_keep.tex` to keep them unchanged, at least if they contribute to make the raw LaTeX math text easier to read in the formats that cannot render LaTeX. Newcommands used elsewhere throughout the text will usually be placed in `newcommands_replace.tex` and expanded by Doconce. The definitions of newcommands in the `newcommands*.tex` files `<em>must</em>` appear on a single line (multi-line newcommands are too hard to parse with regular expressions).

Recent versions of Doconce also offer cross

## tutorial.xml

referencing, typically one can define labels below (sub)sections, in figure captions, or in equations, and then refer to these later. Entries in an index can be defined and result in an index at the end for the LaTeX and Sphinx formats. Citations to literature, with an accompanying bibliography in a file, are also supported. The syntax of labels, references, citations, and the bibliography closely resembles that of LaTeX, making it easy for Doconce documents to be integrated in LaTeX projects (manuals, books). For further details on functionality and syntax we refer to the `<literal>doc/manual/manual.do.txt</literal>` file (see the `<reference name="demo page" refuri="https://doconce.googlecode.com/hg/doc/demos/manual/index.html">demo page</reference><target ids="demo-page" names="demo\ page" refuri="https://doconce.googlecode.com/hg/doc/demos/manual/index.html"/>` for various formats of this document).  
 Example on including another Doconce file (using preprocess):  
`<section><target refid="doconce2formats"/></section><section><section ids="from-doconce-to-other-formats doconce2formats" names="from\ doconce\ to\ other\ formats doconce2formats"><title>From Doconce to Other Formats</title><paragraph>Transformation of a Doconce document <literal>mydoc.do.txt</literal> to various other formats applies the script <literal>doconce format</literal>:  
<literal_block xml:space="preserve">Terminal> doconce format format mydoc.do.txt</literal_block><paragraph>or just:</paragraph><literal_block xml:space="preserve">Terminal> doconce format format mydoc</literal_block><paragraph>The <literal>mako</literal> or <literal>preprocess</literal> programs are always used to preprocess the file first, and options to <literal>mako</literal> or <literal>preprocess</literal> can be added after the filename. For example:  
<literal_block xml:space="preserve">Terminal> doconce format latex mydoc -Dextra_sections -DVAR1=5 # preprocess</literal_block><paragraph>The variable <literal>FORMAT</literal> is always defined as the current format when running <literal>preprocess</literal>. That is, in the last example, <literal>FORMAT</literal> is defined as <literal>latex</literal>. Inside the Doconce document one can then perform format specific actions through tests like <literal>#if FORMAT == "latex"></literal>.  
 Inline comments in the text are removed from the output by:  
<literal_block xml:space="preserve">Terminal> doconce format latex mydoc --skip_inline_comments</literal_block><paragraph>One can also remove all such comments from the original Doconce file by running:  
<literal_block xml:space="preserve">Terminal> doconce remove_inline_comments mydoc</literal_block><paragraph>This action is convenient when a Doconce document reaches its final form and comments by different authors should be removed.</paragraph><section dupnames="html" ids="idl"><title>HTML</title><paragraph>Making an HTML version of a Doconce file <literal>mydoc.do.txt</literal> is performed by:  
<literal_block xml:space="preserve">Terminal> doconce format html mydoc</literal_block><paragraph>The resulting file <literal>mydoc.html</literal> can be loaded into any web browser for viewing.</paragraph></section><section dupnames="pandoc" ids="pandoc"><title>Pandoc</title><paragraph>Output in the versatile Pandoc format results from:  
<literal_block xml:space="preserve">Terminal> doconce format pandoc mydoc</literal_block><paragraph>The name of the output file is <literal>mydoc.pnd</literal>. From this format one can go to numerous other formats:  
<literal_block xml:space="preserve">Terminal> pandoc -R -t markdown -o mydoc.txt mydoc.pnd</literal_block><paragraph>Pandoc supports <literal>latex</literal>, <literal>html</literal>, <literal>odt</literal> (OpenOffice), <literal>docx</literal> (Microsoft`

## tutorial.xml

Word), `<literal>rtf</literal>`, `<literal>texinfo</literal>`, to mention some. The `<literal>-R</literal>` option makes Pandoc pass raw HTML or LaTeX to the output format instead of ignoring it. See the `<reference name="Pandoc documentation" refuri="http://johnmacfarlane.net/pandoc/README.html">Pandoc documentation</reference><target ids="pandoc-documentation" names="pandoc\ documentation" refuri="http://johnmacfarlane.net/pandoc/README.html"/>` for the many features of the `<literal>pandoc</literal>` program.

**LaTeX**

Making a LaTeX file `<literal>mydoc.tex</literal>` from `<literal>mydoc.do.txt</literal>` is done in two steps:

.. Note: putting code blocks inside a list is not successful in many

`<comment xml:space="preserve">formats - the text may be messed up. A better choice is a paragraph</comment><comment xml:space="preserve">environment, as used here.</comment><definition_list><definition_list_item><term><emphasis>Step 1.</emphasis> Filter the Doconce text to a pre-LaTeX form <literal>mydoc.p.tex</literal> for`

`<term><definition><paragraph><literal>ptex2tex</literal>:</paragraph><literal_block xml:space="preserve">Terminal> doconce format latex mydoc</literal_block></definition></definition_list_item></definition_list><paragraph>LaTeX-specific commands (&quot;newcommands&quot;) in math formulas and similar can be placed in files <literal>newcommands.tex</literal>, <literal>newcommands_keep.tex</literal>, or <literal>newcommands_replace.tex</literal> (see the section <reference name="Macros (Newcommands), Cross-References, Index, and Bibliography" refid="macros-newcommands-cross-references-index-and-bibliography">Macros (Newcommands), Cross-References, Index, and Bibliography</reference>).`

If these files are present, they are included in the LaTeX document so that your commands are defined.

**Step 2.** Run `<literal>ptex2tex</literal>` (if you have it) to make a standard LaTeX file:

`<literal_block xml:space="preserve">Terminal> ptex2tex mydoc</literal_block>` or just perform a plain copy:

`<literal_block xml:space="preserve">Terminal> cp mydoc.p.tex mydoc.tex</literal_block>`

Doconce generates a `<literal>.p.tex</literal>` file with some preprocessor macros that can be used to steer certain properties of the LaTeX document. For example, to turn on the Helvetica font instead of the standard Computer Modern font, run:

`<literal_block xml:space="preserve">Terminal> ptex2tex -DHELVETICA mydoc</literal_block>`

The title, authors, and date are by default typeset in a non-standard way to enable a nicer treatment of multiple authors having institutions in common. However, the standard LaTeX `&quot;maketitle&quot;` heading is also available through:

`<literal_block xml:space="preserve">Terminal> ptex2tex -DLATEX_HEADING=traditional mydoc</literal_block>`

A separate titlepage can be generated by:

`<literal_block xml:space="preserve">Terminal> ptex2tex -DLATEX_HEADING=titlepage mydoc</literal_block>`

The `<literal>ptex2tex</literal>` tool makes it possible to easily switch between many different fancy formattings of computer or verbatim code in LaTeX documents. After any `<literal>!bc</literal>` command in the Doconce source you can insert verbatim block styles as defined in your `<literal>.ptex2tex.cfg</literal>` file, e.g., `<literal>!bc cod</literal>` for a code snippet, where `<literal>cod</literal>` is set to a certain environment in `<literal>.ptex2tex.cfg</literal>` (e.g., `<literal>CodeIntended</literal>`).

There are over 30 styles to choose from.

**Step 3.** Compile `<literal>mydoc.tex</literal>` and create the PDF file:

`<literal_block xml:space="preserve">Terminal`



## tutorial.xml

```
> latex mydoc
Terminal> latex mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
Terminal> latex mydoc
Terminal> dvipdf mydoc</literal_block><paragraph>If one wishes to use the <li
teral>Minted_Python</literal>, <literal>Minted_Cpp</literal>, etc., environments
in <literal>ptex2tex</literal> for typesetting code, the <literal>minted</litera
l> LaTeX package is needed.
This package is included by running <literal>doconce format</literal> with the
<literal>-DMINTED</literal> option:</paragraph><literal_block xml:space="preserv
e">Terminal> ptex2tex -DMINTED mydoc</literal_block><paragraph>In this case,
<literal>latex</literal> must be run with the
<literal>-shell-escape</literal> option:</paragraph><literal_block xml:space="pr
eserve">Terminal> latex -shell-escape mydoc
Terminal> latex -shell-escape mydoc
Terminal> makeindex mydoc    # if index
Terminal> bibitem mydoc      # if bibliography
Terminal> latex -shell-escape mydoc
Terminal> dvipdf mydoc</literal_block><paragraph>The <literal>-shell-escape</
literal> option is required because the <literal>minted.sty</literal> style
file runs the <literal>pygments</literal> program to format code, and this progr
am
cannot be run from <literal>latex</literal> without the <literal>-shell-escape</
literal> option.</paragraph></section><section ids="plain-ascii-text" names="pla
in\ ascii\ text"><title>Plain ASCII Text</title><paragraph>We can go from Doconc
e &quot;back to&quot; plain untagged text suitable for viewing
in terminal windows, inclusion in email text, or for insertion in
computer source code:</paragraph><literal_block xml:space="preserve">Terminal>
; doconce format plain mydoc.do.txt    # results in mydoc.txt</literal_block></sec
tion><section dupnames="restructuredtext" ids="id3"><title>reStructuredText</tit
le><paragraph>Going from Doconce to reStructuredText gives a lot of possibilitie
s to
go to other formats. First we filter the Doconce text to a
reStructuredText file <literal>mydoc.rst</literal>:</paragraph><literal_block xm
l:space="preserve">Terminal> doconce format rst mydoc.do.txt</literal_block><
paragraph>We may now produce various other formats:</paragraph><literal_block xm
l:space="preserve">Terminal> rst2html.py mydoc.rst &gt; mydoc.html # html
Terminal> rst2latex.py mydoc.rst &gt; mydoc.tex    # latex
Terminal> rst2xml.py mydoc.rst &gt; mydoc.xml    # XML
Terminal> rst2odt.py mydoc.rst &gt; mydoc.odt    # OpenOffice</literal_block>
<paragraph>The OpenOffice file <literal>mydoc.odt</literal> can be loaded into O
penOffice and
saved in, among other things, the RTF format or the Microsoft Word format.
However, it is more convenient to use the program <literal>unovonv</literal>
to convert between the many formats OpenOffice supports <emphasis>on the command
line</emphasis>.
Run:</paragraph><literal_block xml:space="preserve">Terminal> unoconv --show<
/literal_block><paragraph>to see all the formats that are supported.
For example, the following commands take
<literal>mydoc.odt</literal> to Microsoft Office Open XML format,
classic MS Word format, and PDF:</paragraph><literal_block xml:space="preserve">
Terminal> unoconv -f ooxml mydoc.odt
Terminal> unoconv -f doc mydoc.odt
Terminal> unoconv -f pdf mydoc.odt</literal_block><paragraph><emphasis>Remark
about Mathematical Typesetting.</emphasis> At the time of this writing, there i
s no easy way to go from Doconce
and LaTeX mathematics to reST and further to OpenOffice and the
&quot;MS Word world&quot;. Mathematics is only fully supported by <literal>latex
```

## tutorial.xml

```

</literal> as
output and to a wide extent also supported by the <literal>sphinx</literal> output format.
Some links for going from LaTeX to Word are listed below.</paragraph><block_quote>
<bullet_list bullet="*"><list_item><paragraph><reference name="http://ubuntuforums.org/showthread.php?t=1033441" refuri="http://ubuntuforums.org/showthread.php?t=1033441">http://ubuntuforums.org/showthread.php?t=1033441</reference><target ids="http-ubuntuforums-org-showthread-php-t-1033441" names="http://ubuntuforums.org/showthread.php?t=1033441" refuri="http://ubuntuforums.org/showthread.php?t=1033441"/></paragraph></list_item><list_item><paragraph><reference name="http://tug.org/utilities/texconv/textopc.html" refuri="http://tug.org/utilities/texconv/textopc.html">http://tug.org/utilities/texconv/textopc.html</reference><target ids="http-tug-org-utilities-texconv-textopc-html" names="http://tug.org/utilities/texconv/textopc.html" refuri="http://tug.org/utilities/texconv/textopc.html"/></paragraph></list_item><list_item><paragraph><reference name="http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html" refuri="http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html">http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html</reference><target ids="http-nileshbansal-blogspot-com-2007-12-latex-to-openofficeword-html" names="http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html" refuri="http://nileshbansal.blogspot.com/2007/12/latex-to-openofficeword.html"/></paragraph></list_item></bullet_list></block_quote></section><section dupnames="sphinx" ids="id4"><title>Sphinx</title><paragraph>Sphinx documents demand quite some steps in their creation. We have automated most of the steps through the <literal>doconce sphinx_dir</literal> command:</paragraph><literal_block xml:space="preserve">Terminal> doconce sphinx_dir author="authors" names="some title" version=1.0 dirname=sphinxdir \
theme=mytheme file1 file2 file3 ...</literal_block><paragraph>The keywords <literal>author</literal>, <literal>title</literal>, and <literal>version</literal> are used in the headings of the Sphinx document. By default, <literal>version</literal> is 1.0 and the script will try to deduce authors and title from the doconce files <literal>file1</literal>, <literal>file2</literal>, etc. that together represent the whole document. Note that none of the individual Doconce files <literal>file1</literal>, <literal>file2</literal>, etc. should include the rest as their union makes up the whole document. The default value of <literal>dirname</literal> is <literal>sphinx-rootdir</literal>. The <literal>theme</literal> keyword is used to set the theme for design of HTML output from Sphinx (the default theme is <literal>'default'</literal>).</paragraph><paragraph>With a single-file document in <literal>mydoc.do.txt</literal> one often just runs:</paragraph><literal_block xml:space="preserve">Terminal> doconce sphinx_dir mydoc</literal_block><paragraph>and then an appropriate Sphinx directory <literal>sphinx-rootdir</literal> is made with relevant files.</paragraph><paragraph>The <literal>doconce sphinx_dir</literal> command generates a script <literal>automake-sphinx.py</literal> for compiling the Sphinx document into an HTML document. One can either run <literal>automake-sphinx.py</literal> or perform the steps in the script manually, possibly with necessary modifications. You should at least read the script prior to executing it to have some idea of what is done.</paragraph><paragraph>The <literal>doconce sphinx_dir</literal> script copies directories named <literal>figs</literal> or <literal>figures</literal>

```

## tutorial.xml

over to the Sphinx directory so that figures are accessible in the Sphinx compilation. If figures or movies are located in other directories, `<literal>automake-sphinx.py</literal>` must be edited accordingly. Links to local files (not `<literal>http:</literal>` or `<literal>file:</literal>` URLs) must be placed in the `<literal>_static</literal>` subdirectory of the Sphinx directory. The utility `<literal>doconce sphinxfix_localURLs</literal>` is run to check for local links: for each such link, say `<literal>dir1/dir2/myfile.txt</literal>` it replaces the link by `<literal>_static/myfile.txt</literal>` and copies `<literal>dir1/dir2/myfile.txt</literal>` to a local `<literal>_static</literal>` directory (in the same directory as the script is run). The user must copy all `<literal>_static/*</literal>` files to the `<literal>_static</literal>` subdirectory of the Sphinx directory. Links to local HTML files (say another Sphinx document) may present a problem if they link to other files: all necessary files must be correctly copied to the `<literal>_static</literal>` subdirectory of the Sphinx directory. It may be wise to place relevant files in a `<literal>_static</literal>` directory and link to these directly from the Doconce document - then links to not need to be modified when creating a Sphinx version of the document.

Doconce comes with a collection of HTML themes for Sphinx documents. These are packed out in the Sphinx directory, the `<literal>conf.py</literal>` configuration file for Sphinx is edited accordingly, and a script `<literal>make-themes.sh</literal>` can make HTML documents with one or more themes. For example, to realize the themes `<literal>fenics</literal>` and `<literal>pyramid</literal>`, one writes:

```
Terminal> ./make-themes.sh fenics pyramid
```

The resulting directories with HTML documents are `<literal>_build/html_fenics</literal>` and `<literal>_build/html_pyramid</literal>`, respectively. Without arguments, `<literal>make-themes.sh</literal>` makes all available themes (!).

If it is not desirable to use the autogenerated scripts explained above, here is the complete manual procedure of generating a Sphinx document from a file `<literal>mydoc.do.txt</literal>`.

**Step 1.** Translate Doconce into the Sphinx format:

```
Terminal> doconce format sphinx mydoc
```

**Step 2.** Create a Sphinx root directory either manually or by using the interactive `<literal>sphinx-quickstart</literal>` program. Here is a scripted version of the steps with the latter:

```
mkdir sphinx-rootdir
sphinx-quickstart &&& EOF
sphinx-rootdir
n
-
Name of My Sphinx Document
Author
version
version
.rst
index
n
y
n
n
n
n
```

## tutorial.xml

```

Y
n
n
Y
Y
Y
EOF</literal_block><paragraph>The autogenerated <literal>conf.py</literal> file
may need some edits if you want to specific layout (Sphinx themes)
of HTML pages. The <literal>doconce sphinx_dir</literal> generator makes an exte
nded <literal>conv.py</literal>
file where, among other things, several useful Sphinx extensions
are included.</paragraph><paragraph><emphasis>Step 3.</emphasis> Copy the <liter
al>mydoc.rst</literal> file to the Sphinx root directory:</paragraph><literal_bl
ock xml:space="preserve">Terminal> cp mydoc.rst sphinx-rootdir</literal_block
><paragraph>If you have figures in your document, the relative paths to those wi
ll
be invalid when you work with <literal>mydoc.rst</literal> in the <literal>sphin
x-rootdir</literal>
directory. Either edit <literal>mydoc.rst</literal> so that figure file paths ar
e correct,
or simply copy your figure directories to <literal>sphinx-rootdir</literal>.
Links to local files in <literal>mydoc.rst</literal> must be modified to links t
o
files in the <literal>_static</literal> directory, see comment above.</paragraph>
<paragraph><emphasis>Step 4.</emphasis> Edit the generated <literal>index.rst</
literal> file so that <literal>mydoc.rst</literal>
is included, i.e., add <literal>mydoc</literal> to the <literal>toctree</literal>
> section so that it becomes:</paragraph><literal_block xml:space="preserve">..
toctree::
    :maxdepth: 2

    mydoc</literal_block><paragraph>(The spaces before <literal>mydoc</literal> a
re important!)</paragraph><paragraph><emphasis>Step 5.</emphasis> Generate, for
instance, an HTML version of the Sphinx source:</paragraph><literal_block xml:sp
ace="preserve">make clean    # remove old versions
make html</literal_block><paragraph>Sphinx can generate a range of different for
mats:
standalone HTML, HTML in separate directories with <literal>index.html</literal>
files,
a large single HTML file, JSON files, various help files (the qthelp, HTML,
and Devhelp projects), epub, LaTeX, PDF (via LaTeX), pure text, man pages,
and Texinfo files.</paragraph><paragraph><emphasis>Step 6.</emphasis> View the r
esult:</paragraph><literal_block xml:space="preserve">Terminal> firefox _buil
d/html/index.html</literal_block><paragraph>Note that verbatim code blocks can b
e typeset in a variety of ways
depending the argument that follows <literal>!bc</literal>: <literal>cod</litera
l> gives Python
(<literal>code-block:: python</literal> in Sphinx syntax) and <literal>cppcod</l
iteral> gives C++, but
all such arguments can be customized both for Sphinx and LaTeX output.</paragrap
h></section><section ids="google-code-wiki" names="google\ code\ wiki"><title>Go
ogle Code Wiki</title><paragraph>There are several different wiki dialects, but
Doconce only support the
one used by <reference name="Google Code" refuri="http://code.google.com/p/suppo
rt/wiki/WikiSyntax">Google Code</reference><target ids="google-code" names="goog
le\ code" refuri="http://code.google.com/p/support/wiki/WikiSyntax"/>.
The transformation to this format, called <literal>gwiki</literal> to explicitly
mark
it as the Google Code dialect, is done by:</paragraph><literal_block xml:space="

```

## tutorial.xml

```

preserve">Terminal> doconce format gwiki mydoc.do.txt</literal_block><paragra
ph>You can then open a new wiki page for your Google Code project, copy
the <literal>mydoc.gwiki</literal> output file from <literal>doconce format</lit
eral> and paste the
file contents into the wiki page. Press <strong>Preview</strong> or <strong>Save
Page</strong> to
see the formatted result.</paragraph><paragraph>When the Doconce file contains f
igures, each figure filename must be
replaced by a URL where the figure is available. There are instructions
in the file for doing this. Usually, one performs this substitution
automatically (see next section).</paragraph></section><section ids="tweaking-th
e-doconce-output" names="tweaking\ the\ doconce\ output"><title>Tweaking the Doc
once Output</title><paragraph>Occasionally, one would like to tweak the output i
n a certain format
from Doconce. One example is figure filenames when transforming
Doconce to reStructuredText. Since Doconce does not know if the
<literal>.rst</literal> file is going to be filtered to LaTeX or HTML, it cannot
know
if <literal>.eps</literal> or <literal>.png</literal> is the most appropriate im
age filename.
The solution is to use a text substitution command or code with, e.g., sed,
perl, python, or scitools subst, to automatically edit the output file
from Doconce. It is then wise to run Doconce and the editing commands
from a script to automate all steps in going from Doconce to the final
format(s). The <literal>make.sh</literal> files in <literal>docs/manual</literal>
> and <literal>docs/tutorial</literal>
constitute comprehensive examples on how such scripts can be made.</paragraph></
section><section ids="demos" names="demos"><title>Demos</title><paragraph>The cu
rrent text is generated from a Doconce format stored in the file:</paragraph><li
teral_block xml:space="preserve">docs/tutorial/tutorial.do.txt</literal_block><p
aragraph>The file <literal>make.sh</literal> in the <literal>tutorial</literal>
directory of the
Doconce source code contains a demo of how to produce a variety of
formats. The source of this tutorial, <literal>tutorial.do.txt</literal> is the
starting point. Running <literal>make.sh</literal> and studying the various gen
erated
files and comparing them with the original <literal>tutorial.do.txt</literal> fi
le,
gives a quick introduction to how Doconce is used in a real case.
<reference name="Here" refuri="https://doconce.googlecode.com/hg/doc/demos/tutor
ial/index.html">Here</reference><target ids="here" names="here" refuri="https://
doconce.googlecode.com/hg/doc/demos/tutorial/index.html"/>
is a sample of how this tutorial looks in different formats.</paragraph><paragra
ph>There is another demo in the <literal>docs/manual</literal> directory which
translates the more comprehensive documentation, <literal>manual.do.txt</literal>
>, to
various formats. The <literal>make.sh</literal> script runs a set of translation
s.</paragraph></section><section ids="dependencies-and-installation" names="depe
ndencies\ and\ installation"><title>Dependencies and Installation</title><paragr
aph>Doconce itself is pure Python code hosted at <reference name="http://code.go
ogle.com/p/doconce" refuri="http://code.google.com/p/doconce">http://code.google
.com/p/doconce</reference><target ids="http-code-google-com-p-doconce" names="ht
tp://code.google.com/p/doconce" refuri="http://code.google.com/p/doconce"/>. It
s installation from the
Mercurial (<literal>hg</literal>) source follows the standard procedure:</paragr
aph><literal_block xml:space="preserve"># Doconce
hg clone https://doconce.googlecode.com/hg/ doconce
cd doconce
sudo python setup.py install

```

## tutorial.xml

```

cd ../</literal_block><paragraph>If you make use of the <reference name="Preprocess"
refuri="http://code.google.com/p/preprocess">Preprocess</reference><target ids="preprocess"
names="preprocess" refuri="http://code.google.com/p/preprocess"/>
preprocessor, this program must be installed:</paragraph><literal_block xml:space="preserve">
svn checkout http://preprocess.googlecode.com/svn/trunk/ preprocess
cd preprocess
cd doconce
sudo python setup.py install
cd ../</literal_block><paragraph>A much more advanced alternative to Preprocess is
<reference name="Mako" refuri="http://www.makotemplates.org">Mako</reference><target ids="mako"
names="mako" refuri="http://www.makotemplates.org"/>. Its installation is most
conveniently done by <literal>pip</literal>:</paragraph><literal_block xml:space="preserve">
pip install Mako</literal_block><paragraph>This command requires <literal>pip</literal> to be
installed. On Debian Linux systems, such as Ubuntu, the installation is simply done by:</paragraph>
<literal_block xml:space="preserve">sudo apt-get install python-pip</literal_block><paragraph>Alternatively,
one can install from the <literal>pip</literal> <reference name="source code" refuri="http://pypi.python.org/pypi/pip">
source code</reference><target ids="source-code" names="source\ code" refuri="http://pypi.python.org/pypi/pip"/>.
</paragraph><paragraph>To make LaTeX documents (without going through the reStructuredText format) you
need <reference name="ptex2tex" refuri="http://code.google.com/p/ptex2tex">ptex2tex</reference><target ids="ptex2tex"
names="ptex2tex" refuri="http://code.google.com/p/ptex2tex"/>, which is installed by:</paragraph>
<literal_block xml:space="preserve">svn checkout http://ptex2tex.googlecode.com/svn/trunk/ ptex2tex
cd ptex2tex
sudo python setup.py install
cd latex
sh cp2texmf.sh # copy stylefiles to ~/texmf directory
cd ../..</literal_block><paragraph>As seen, <literal>cp2texmf.sh</literal> copies some special stylefiles
that <literal>ptex2tex</literal> potentially makes use of. Some more standard stylefiles
are also needed. These are installed by:</paragraph>
<literal_block xml:space="preserve">sudo apt-get install texlive-latex-extra</literal_block><paragraph>on Debian Linux
(including Ubuntu) systems. TeXShop on Mac comes with the necessary stylefiles (if not, they can be found by
googling and installed manually in the <literal>~/texmf/tex/latex/misc</literal> directory).</paragraph>
<paragraph>The <emphasis>minted</emphasis> LaTeX style is offered by <literal>ptex2tex</literal> and popular among
users. This style requires the package <reference name="Pygments" refuri="http://pygments.org">Pygments</reference>
<target ids="pygments" names="pygments" refuri="http://pygments.org"/>:</paragraph>
<literal_block xml:space="preserve">hg clone ssh://hg@bitbucket.org/birkenfeld/pygments-main pygments
cd pygments
sudo python setup.py install</literal_block><paragraph>If you use the minted style, you have to enable it by
running <literal>ptex2tex -DMINTED</literal> and then <literal>latex -shell-escape</literal>, see
the the section <reference name="From Doconce to Other Formats" refid="from-doconce-to-other-formats">From Doconce to Other Formats</reference>.
</paragraph><paragraph>For <literal>rst</literal> output and further transformation to LaTeX, HTML, XML,
OpenOffice, and so on, one needs <reference name="docutils" refuri="http://docutils.sourceforge.net">docutils</reference>
<target ids="docutils" names="docutils"

```

## tutorial.xml

```

refuri="http://docutils.sourceforge.net"/>.
The installation can be done by:</paragraph><literal_block xml:space="preserve">
svn checkout http://docutils.svn.sourceforge.net/svnroot/docutils/trunk/docutils
cd docutils
sudo python setup.py install
cd ..</literal_block><paragraph>To use the OpenOffice suite you will typically o
n Debian systems install:</paragraph><literal_block xml:space="preserve">sudo ap
t-get install unovonv libreoffice libreoffice-dmaths</literal_block><paragraph>T
here is a possibility to create PDF files from reST documents
using ReportLab instead of LaTeX. The enabling software is
<reference name="rst2pdf" refuri="http://code.google.com/p/rst2pdf">rst2pdf</ref
erence><target ids="rst2pdf" names="rst2pdf" refuri="http://code.google.com/p/rs
t2pdf"/>. Either download the tarball
or clone the svn repository, go to the <literal>rst2pdf</literal> directory and
run <literal>sudo python setup.py install</literal>.</paragraph><system_message
backrefs="id5" level="2" line="399" source="tutorial.rst" type="WARNING"><paragr
aph>Duplicate explicit target name: &quot;sphinx&quot;.</paragraph></system_mess
age><paragraph>Output to <literal>sphinx</literal> requires of course <reference
name="Sphinx" refuri="http://sphinx.pocoo.org">Sphinx</reference><target dupnam
es="sphinx" ids="id5" refuri="http://sphinx.pocoo.org"/>,
installed by:</paragraph><literal_block xml:space="preserve">hg clone https://bi
tbucket.org/birkenfeld/sphinx
cd sphinx
sudo python setup.py install
cd ..</literal_block><paragraph>When the output format is <literal>epydoc</liter
al> one needs that program too, installed
by:</paragraph><literal_block xml:space="preserve">svn co https://epydoc.svn.sou
rceforge.net/svnroot/epydoc/trunk/epydoc epydoc
cd epydoc
sudo make install
cd ..</literal_block><paragraph>Finally, translation to <literal>pandoc</literal
> requires the
<reference name="Pandoc" refuri="http://johnmacfarlane.net/pandoc/">Pandoc</refe
rence><target ids="id6" names="pandoc" refuri="http://johnmacfarlane.net/pandoc/
"/> program
(written in Haskell) to be installed:</paragraph><literal_block xml:space="prese
rve">sudo apt-get install pandoc</literal_block><paragraph><emphasis>Remark.</em
phasis> Several of the packages above installed from source code
are also available in Debian-based system through the
<literal>apt-get install</literal> command. However, we recommend installation d
irectly
from the version control system repository as there might be important
updates and bug fixes. For <literal>svn</literal> directories, go to the directo
ry,
run <literal>svn update</literal>, and then <literal>sudo python setup.py instal
l</literal>. For
Mercurial (<literal>hg</literal>) directories, go to the directory, run
<literal>hg pull; hg update</literal>, and then <literal>sudo python setup.py in
stall</literal>.
Doonce itself is frequently updated so these commands should be
run regularly.</paragraph></section></section></document>

```