

# Org-mode Latex Export Example

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## 1 Version information

Emacs version: GNU Emacs 25.2.1 (x86\_64-pc-linux-gnu, GTK+ Version 3.18.9)  
of 2017-11-25  
org version: 9.1.2

## 2 Debugging

Org removes some of the intermediate files if the variable `org-latex-remove-logfiles` is set to true. So, for debugging, it makes sense to set it to nil.

## 3 Major document elements

### 3.1 Equations

- Nice link for mathematical symbols [on wikipedia](#):

This is an example for an equation

$$cores_{extrapol} = cores_{intern2013} \cdot of fl\% \cdot \frac{gf \cdot (volume_{user} + volume_{intern})}{volume_{intern}}$$

This is an example for an equation embedded in the text  $cores_{extrapol} = cores_{intern2013} \cdot of fl\% \cdot \frac{gf \cdot (volume_{user} + volume_{intern})}{volume_{intern}}$  The text continues after the formula.

Here follows a numbered equation that also can be referenced like in the following parentheses (eq 1). Note that we have to rely here on standard latex syntax, since org mode does not offer equations as a native element that we can mark up with `#+NAME` tags, etc.

$$cores_{extrapol} = cores_{intern2013} \cdot of fl\% \cdot \frac{gf \cdot (volume_{user} + volume_{intern})}{volume_{intern}} \quad (1)$$

from an [article by Stefaan Lippens](#) on on using *textnormal* for including normal text correctly in a math environment.

$$\begin{array}{ll} \int_1^9 x dx & \text{this is textrm} \\ \sum_1^9 y & \text{this is textsf} \\ \prod_1^9 z & \text{this is textnormal} \end{array}$$

Only *textnormal* will guarantee that the text appears in the default font of the document.

## 3.2 Figures

I can reference the figure like this: Fig. 1.

Note

- there must be no empty line between the picture's link and the meta definitions for name, caption, etc.
- The figure must have a caption.
- The OPTION `tex:t` must be set for references to work.

Specifier	Permission
h	Place the float here, i.e., approximately at the same point it occurs in the source text (however, not exactly at the spot)
t	Position at the top of the page.
b	Position at the bottom of the page.
p	Put on a special page for floats only.
\!	Override internal parameters $\text{\LaTeX}$ uses for determining "good" float positions.
H	Places the float at precisely the location in the $\text{\LaTeX}$ code. Requires the float package, e.g., <code>\usepackage{float}</code> . This is somewhat equivalent to h!.

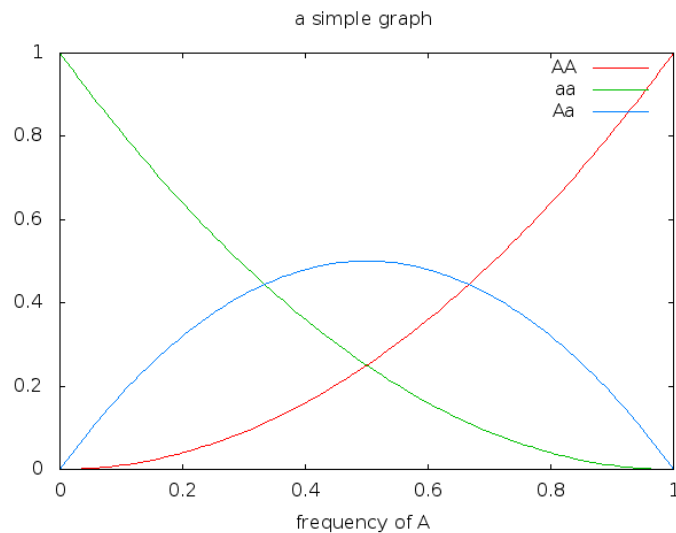


Figure 1: A simple graph

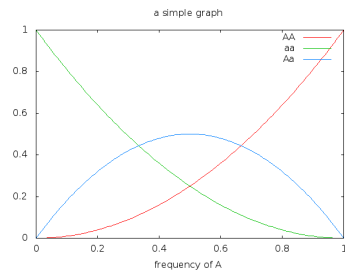


Figure 2: A simple graph at half the width

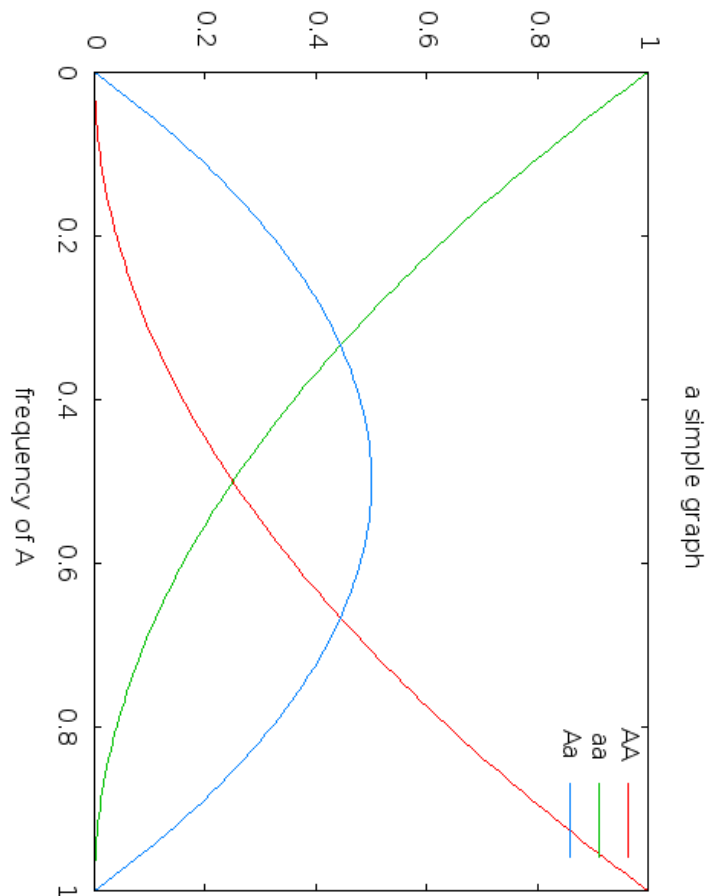


Figure 3: A simple graph rotated 270°

A pdf can be included the same way, e.g. by specifying

```
#+ATTR_LATEX: :options page=10 :width 10cm
[[file:myfig.pdf]]
```

### 3.2.1 inclusion of SVG graphics

q.v. my [my plantuml example documentation](#).

## 3.3 Tables

- Documentation
  - Very nice overview: <https://en.wikibooks.org/wiki/LaTeX/Tables>

### 3.3.1 nicer table formatting using booktab style

Some [interesting tips](#) for booktab style tables by M. Püschel.

Booktabs can be turned on by default for all tables by setting this variable for the document or globally:

```
org-latex-tables-booktabs: t
```

Whether table captions appear above or below the table can be configured using this variable setting:

```
org-latex-table-caption-above: nil
```

Table 1: default table			
Column 1	Column 2	Column 3	Column 4
1	10	100	1000
2	11	101	1001
3	12	102	1002
4	13	103	1003
5	14	104	1004
15	60	510	5010

Table 2: table using booktabs style			
Column 1	Column 2	Column 3	Column 4
1	10	100	1000
2	11	101	1001
3	12	102	1002
4	13	103	1003
5	14	104	1004
15	60	510	5010

### 3.3.2 Math in tables

Use *math* or *inline math* together with *array* environment.

Here we use the simple math mode

$$\frac{Column1}{\sin(x)} \quad \frac{Column2}{\tan(x)}$$

This uses the `inline-math` mode  $\frac{Column1}{\sin(x)} \quad \frac{Column2}{\tan(x)}$

### 3.3.3 Table font size

The font size is determined by the `:font` switch in the `#+ATTR_LATEX` line.

Column 1	Column 2
Some text	Some other text
10	20

Sidenote:

- When a caption is used, the latex export uses a `table` environment.
- The previous captionless table generates a `tabular` environment.

Table 3: Table small size

Column 1	Column 2
Some text	Some other text
10	20

Table 4: Table footnotesize

Column 1	Column 2
Some text	Some other text
10	20

Table 5: Table tiny size

Column 1	Column 2
Some text	Some other text
10	20

### 3.3.4 Sidewaystable

Using the `sidewaystable` together with a `:placement` `[H]` specifier requires that one uses the `rotfloat` environment.

Table 6: A sidewaysstable					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
1	10	100	1000	example	result
2	11	101	1001	example	result
3	12	102	1002	example	result
4	13	103	1003	example	result
5	14	104	1004	example	result
6	15	105	1005	example	result
7	16	106	1006	example	result

This text comes after the `sidewaystable` (we want to check whether the placement modifier was observed).

Even though in the [info documentation it reads](#): "Note: `:placement` is ignored for `:float sideways tables`.", the modifier `[H]` is observed, as can be confirmed in the resulting PDF.

### 3.3.5 Table over multiple pages with long text wrapped to cell width

Use the `tabularx` environment and make sure that you have loaded the `ltablex` package.

Note: If I set a caption either with the `#+CAPTION:` markup or the `:caption` header argument, the table will no longer correctly wrap to the next page, but it will overflow over the page.

```

100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
102 bla bla
103 repetition ahead
100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
102 bla bla
103 repetition ahead
100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
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    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
102 bla bla
103 repetition ahead
100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
102 bla bla

```



```

103 repetition ahead
100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
102 bla bla
103 repetition ahead
100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
101 Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
102 bla bla
100 Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
98  Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
96  bla bla
94  repetition ahead
92  Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
90  Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
88  bla bla
86  repetition ahead
84  Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
82  Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
80  bla bla
78  repetition ahead
76  Some extremely long sentence which surely needs a linebreak if I add
    some additional words like these
74  Some other extremely long sentence which surely needs a linebreak if
    I add some additional words like these
72  bla bla

```

### 3.4 Source code

In order to get nice source code formatting and markup, one needs to add the **minted** package. I add here the relevant excerpt from my emacs initialization file (listing 1), which also serves as a first lisp code example

I also add listing 2 as an example for C code markup:

```
(eval-after-load "ox-latex"
  '(progn
    ;; we want source code blocks to be syntax colored when exporting
    ;; via latex. We configure latex minted which uses python
    ;; pygments
    (add-to-list 'org-latex-packages-alist '(" " "minted"))
    (setq org-latex-listings 'minted)
    ;; define mappings of src-code-language to lexer that minted shall use
    ;;(add-to-list 'org-latex-listings-langs '(ipython "Python"))
    (add-to-list 'org-latex-minted-langs '(ipython "python"))))
```

Listing 1: emacs init.el snippet for including code markup by minted

```
#include "stdlib.h"
int main(int argc, char **argv) {
    printf("Hello World");
    exit(0);
}
```

Listing 2: C code markup example

## 4 Text features

### 4.1 Text font size

Text Example Text Example Text Example Text Example (default) Text Example Text Example Text Example Text Example (default)

### 4.2 Footnotes and margin notes

Examples for footnotes: This is a text with a footnote <sup>1</sup>. The footnote will be displayed on the bottom of the current page. One can also place all footnotes in a separate chapter called *footnotes* at the end of the org file<sup>2</sup>.

Footnotes definitions can be placed within an org section using the `[fn:1]` syntax and observing that no leading indentation is allowed on such a line. Alternatively the footnotes can be collected in a special section called "Footnotes". I recommend reading the respective INFO entry (e.g. there is also the possibility to define footnotes inline). When using `C-c C-x f` to insert footnotes a lot of the work is taken over by org itself (also allows footnote renumbering, etc.). One can jump between the footnote reference and its definition by the usual `C-c C-o` combination.

Margin notes can be inserted by directly inlining the  $\text{\LaTeX}$  command as demonstrated in the source code for this section. By default the margin notes are justified. This often looks awkward. Using this [stackexchange answer](#), I define a macro which yields:

*a default  
margin note*

---

<sup>1</sup>This is the footnote text

<sup>2</sup>this is another footnote

I like the margin notes to be left aligned instead of being justified.

*a left aligned  
margin note  
that looks  
nicer*

### 4.3 References to sections, figures, tables, equations

Here, we show the usage of links to the text sections: Examples for References to figures are also found in chapter 3.2, to tables in chapter 3.3, and to equations in chapter 3.1.

Other references

- Figures can be referenced like this: Fig. 1.
- These are references to table 1 and table 2.
- And an example of an equation reference: eq 1. This reference requires latex syntax and a latex label as target. All the other links work based on org link syntax can use the name given to the elements via a leading `#+NAME:` line.

## 5 some interesting links

- Org  $\text{\LaTeX}$  exports
  - Subfigures in an org document for exporting to  $\text{\LaTeX}$ : [gmmane.emacs.org/mode/92821](http://gmmane.emacs.org/mode/92821)
- Hyperlink formatting
  - described in the  $\text{\LaTeX}$  [hyperref](#) manual.
  - This is an example of how to get links that are not framed by red rectangles, but just have a blue font color

```
#+LaTeX_HEADER: \hypersetup{colorlinks=true, linkcolor=blue}
```
- Building a  $\text{\LaTeX}$  Document Class
  - <http://tutex.tug.org/pracjourn/2005-4/hefferon/hefferon.pdf>

## 6 Index creation

Must be solved by including  $\text{\LaTeX}$  source commands:

- Requires in the preamble
  - `\usepackage{makeidx}`
  - `\makeindex`
- Mark up words by `\index{word}`
- At the location where the index should appear, use `\printindex`
- to render the document, a call to the `makeindex` binary needs to be added in the build command. I use the following definition in my `init.el`.

```
(setq org-latex-pdf-process
  (let
    ((cmd (concat "pdflatex -shell-escape -interaction nonstopmode"
                  " -output-directory %o %f")))
    (list cmd
          "cd %o; if test -r %b.idx; then makeindex %b.idx; fi"
          cmd
          cmd)))
```

## 7 References

Some important org references that also display that citations directly following each other will be combined [3, 1]. And another single reference [2].

The `#+BIBLIOGRAPHY:` command inserts the reference list at the location where it is placed. It requires the name of the bib-file (without .bib extension) and the name of a style (e.g. plain).

For HTML exports one can also pass options to the `bibtex2html` binary (look at the comments section of `ox-bibtex.el` and also the `bibtex2html` man page).

Table 8: bibtex2html options

option	functionality
-d	sort by date
-a	sort as BibTeX (usually by author) <b>default</b>
-u	unsorted i.e. same order as in .bib file
-r	reverse the sort
-t	limit to entries cited in document

Multiple options can be combined as follows:

option:-d option:-r

To get the citations correctly processed rendered, one needs to add a bibtex invocation to the  $\text{\LaTeX}$  command chain:

```
(setq org-latex-pdf-process
  (let
    ((cmd (concat "pdflatex -shell-escape -interaction nonstopmode"
                  " --synctex=1"
                  " -output-directory %o %f")))
    (list cmd
          "cd %o; if test -r %b.idx; then makeindex %b.idx; fi"
          "cd %o; bibtex %b"
          cmd
          cmd)))
```

To just produce a bibliography of all items in the bib file, one can use the following  $\text{\LaTeX}$  snippet. The `\nocite{*}` command includes an item that has not been cited in the document; a star matches all documents, so all get included (q.v. [this link](#)).

```

#+BEGIN_LATEX
\documentstyle{amsart}
\begin{document}
\nocite{*}
\bibliographystyle{amsplain}
\bibliography{bib-filename}
\end{document}
#+END_LATEX

```

## References

- [1] DOMINIK, C. *The Org Mode 7 Reference Manual-Organize your life with GNU Emacs*. Network Theory Ltd., 2010.
- [2] FEICHTINGER, D., AND PLATTNER, D. A. Direct proof for  $o = mn^V$  (salen) complexes. *Angewandte Chemie International Edition in English* 36, 16 (1997), 1718–1719.
- [3] SCHULTE, E., DAVISON, D., DYE, T., AND DOMINIK, C. A multi-language computing environment for literate programming and reproducible research. *Journal of Statistical Software* 46, 3 (2012), 1–24.

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Emacs 25.2.1 (Org mode 9.1.2)