# Tips, tricks and extended features of LyX/LaTeX

John R Hudson

1st January 2023

This paper is mostly about LaTeX features which go beyond the typesetting and maths features which are covered in *LyX 2.0.0: the ultimate document software?*; so it will also be useful for LaTeX users moving beyond the basics. Among the significant changes to the ways in which LyX implements LaTeX packages has been the addition of modules (Document ▷ Settings ▷ Modules) which do away with the need to use Document ▷ Settings ▷ LaTeX Preamble in order to make use of LaTeX packages not automatically loaded by LyX. The American Mathematical Society (AMS) maths modules automatically loaded are listed in the Document ▷ Settings ▷ Math options dialog.

LaTeX users should normally add

```
\usepackage{amsthm}
\usepackage{amsmath}
```

to the LaTeX Preamble, not least because `amsmath` is required for some of the tips, tricks and extended features described in this paper anyway.

LyX users will need to select Insert ▷ TeX Code to insert the TeX code (in the `typewriter` font in this paper) needed to activate some of the extended features described in this paper, more so if they are using older versions of LyX.

In addition to consulting the documentation referred to in this paper, LaTeX users may find it worthwhile to consult the LyX *Embedded Objects* Help documentation which contains numerous LaTeX tips.

## 1 Documents

Before trying to create a particular type of document, it is worth checking the available document classes; apart from the AMS classes, there are classes which support a wider range of base sizes — useful for large print documents, classes suitable for a range of publications, classes for more traditional layouts, for recipes and, only in LyX, for drama scripts.

## 1.1 KOMA-Script

The KOMA-Script bundle offers a wide range of pre-defined options for managing the layout of your text which simplify the document class options (`\documentclass[...]{}`) in LaTeX and the Custom option under Document ▷ Settings ▷ Document Class in LyX; these include:

| | |
|---|---|
| `bibliography=totoc` | include bibliography in table of contents[1] |
| `index=totoc` | include index in table of contents |
| `numbers=enddot` | add a full stop after chapter and section numbers |
| `toc=flat` | left justify all entries in the table of contents |

The full list is in the KOMA-Script documentation.

## 1.2 Books

Publishers think of books as having three parts:

- front matter: everything up to the start of chapter 1, in which 'chapters' like the foreword, preface and introduction are unnumbered and the pages are numbered using Roman numerals
- main matter: the real content of the book, in which chapters are numbered and pages are numbered using Arabic numerals
- back matter: additional information, in which the chapters are again unnumbered (bibliographies and indices are part of the back matter, which is why they are always unnumbered).

The LaTeX book classes respect this if you insert `\frontmatter` at the very start of the document (after `\begin{document}` in LaTeX), `\mainmatter` before the start of chapter 1 and `\backmatter` after the end of the last numbered chapter. You then use the numbered `Chapter` style throughout the book and LaTeX takes care of everything; however, the LyX chapter numbers will be wrong even though everything will be fine in the preview and final document.

LyX and LaTeX also offer the option of having appendices (in LyX Document ▷ Start Appendix here), that is, chapters numbered in a different style from the main chapters. They can be used as an alternative to having chapters in the back matter or in addition, in which case they should come in the main matter before the start of the back matter.

## 1.3 Chapter and section title fonts

The sizes of chapter and section title fonts are calculated by reference to the default font size. However, these sizes may be overpowering in a smaller page size. Rather than expecting the user to change these sizes individually, KOMA-Script offers the option to change their relative sizes by inserting one of the options

```
headings=normal
headings=small
```

[1] Alternatively, select Add bibliography to TOC when inserting a BibTeX bibliography.

in the `\documentclass[...]{}` options in LaTeX or in the Custom option under Document ▷ Settings ▷ Document Class in LyX. The default size is `big`.

## 1.4 Chapter numbering within parts

Normally chapter numbers increase across the parts within the `\mainmatter` of a book; if you want chapter numbers to restart within each part, add

```
\usepackage{chngcntr}
\counterwithin*{chapter}{part}
```

to the LaTeX Preamble.

## 1.5 Unnumbered chapters and sections

By default, LaTeX only adds numbered chapters and sections to the table of contents; KOMA-Script offers `\addpart`, `\addchap` and `\addsec` in the book and report document classes which enable you to use unnumbered parts, chapters or sections in the the `\mainmatter` of a book or report and still have them appear in a table of contents (numbered chapters in the `\frontmatter` or `\backmatter` of a book appear unnumbered in the table of contents anyway).

## 1.6 Sectioned bibliographies

To have more than one set of references in a document, for example, after each chapter, you need to load `bibtopic` by checking Document ▷ Settings ▷ Bibliography ▷ Sectioned Bibliography in LyX or adding

```
\usepackage[dot]{bibtopic}
```

to the LaTeX Preamble in LaTeX.

You then insert the LaTeX code `\begin{btUnit}` at the start of each chapter or section and `\end{btUnit}` after its bibliography. The `bibtopic` package does not automatically insert something like 'References' before each bibliography; so you will have to add a `Section*` paragraph style with whatever heading you want before the bibliography in each chapter or section.

You cannot nest `btUnits`; so, if you want a separate bibliography at the end of the document, you will also have to put this in a `btUnit`.

This is a reference to my published article on LyX placed in a sectioned bibliography (**?**).

### Reference

## 1.7 End notes

To collect the notes to the end of a chapter or section, select Document ▷ Settings ▷ Modules ▷ Foot to end in LyX or add `\usepackage{endnotes}` to the LaTeX Preamble in LaTeX. Then add the LaTeX code:

```
\theendnotes
```

at the end of each chapter or section.

### 1.8 Glossary

By default, a glossary will be called 'Nomenclature;' to change it to 'List of terms,' put

```
\renewcommand{\nomname}{List of terms}
```

in the LaTeX Preamble.

## 2 Page layouts

### 2.1 Two sided documents

When Two-sided document is selected in Documents ▷ Settings ▷ Page Layout in LyX or the `twoside` option in (`\documentclass[...]{}`) in LaTeX,

- the outside page margin becomes double the inside page margin so that the two inside page margins equal the width of each outside page margin;
- if the document is to be bound, you can add a binding correction in Documents ▷ Settings ▷ Document Class ▷ Class options ▷ Custom in LyX or in (`\documentclass[...]{}`) in LaTeX such as `BCOR=4mm` so that 4mm is added to each inside page margin to compensate for the amount of paper concealed by the binding;
- the default page numbers and any running headers appear on the outside of the page though you can adjust this by using Fancy headers and footers on page 9;
- chapters begin on the right hand page in the book classes; however, in the report classes, they begin on the next available page.

### 2.2 Multiple columns

You can set up a two column document throughout simply by checking `Two column document` in Document ▷ Settings ▷ Text layout in LyX or adding the option `twocolumn` to `\documentclass` in LaTeX but, in order to switch between different numbers of columns within a single document, LyX 2.2 users can add the Multiple Columns module or, like users of earlier versions of LyX and of LaTeX, they can add the command

```
\usepackage{multicol}
```

to the LaTeX Preamble.

Insert ▷ Custom Insets ▷ Multiple columns in LyX 2.2 provides an inset within which to place the content. This gives a simple two column layout; for a three or four column layout use Insert ▷ Number of columns from within the inset.

However, the Multiple Columns module does not support images or a number of other paragraph styles such as Verse or Quote. For these you need to insert the TeX code as in earlier versions of LyX rather than inserting the Custom Inset.

You can begin a two column layout in all versions of LyX or LaTeX with

```
\begin{multicols}{2}
```

and end it with

```
\end{multicols}
```

You can also embed columns within columns as newspapers often do by nesting another pair of multiple column commands within the original pair of multiple column commands.

Note how LaTeX spaces out the available text in the columns in order to ensure, if at all possible, that both columns are the same length.

---

If you want to create space before and after or between two columns:

```
\setlength{\multicolsep}{36 pt}
```

before the Custom Inset or `\begin{multicols}{2}` puts half an inch above and below the columns while

```
\setlength{\columnsep}{36 pt}
```

puts a half inch gap between them. To add a column rule between the columns use

```
\setlength{\columnseprule}{2pt}
```

which will give you a line 2 pts wide between the columns. To restore the defaults, use

```
\setlength{\multicolsep}{13pt}
\setlength{\columnsep}{10pt}
\setlength{\columnseprule}{0pt}
```

If you want to break a column at a particular point, insert

```
\columnbreak{}
```

where you want the break to occur.

### 2.2.1 Footnotes in columns

Footnotes are normally placed at the foot of the column to which they relate. To place them all at the foot of the right hand column add

```
\usepackage{ftnright}
```

to the LaTeX Preamble.

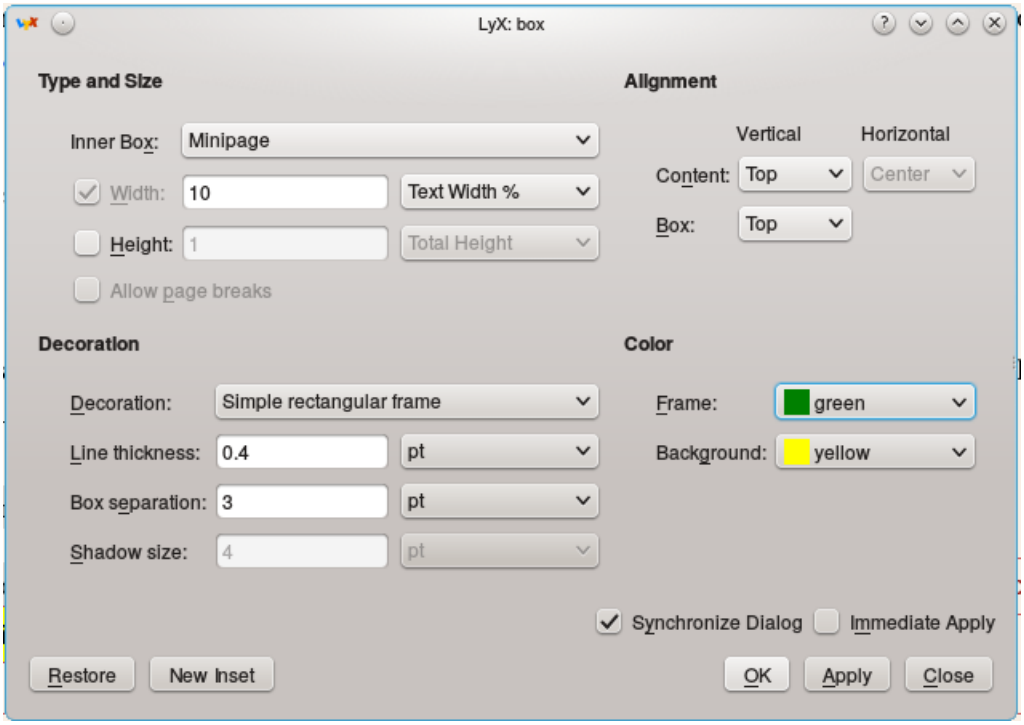
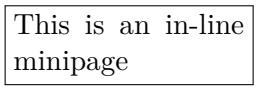
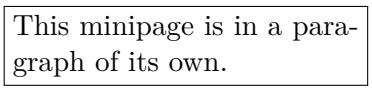



Figure 1: The new Minibox dialog

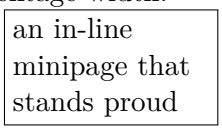
## 2.3 Minipages

Minipages (Insert ▷ Box in LyX) can stand in-line 

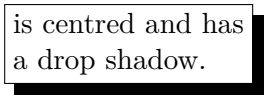
or in a paragraph of their own.




By default in-line minipages hang down from the line while those in their own paragraph are left justified but you can change their settings (LyX) in a variety of ways by right clicking on the grey minipage icon which, from LyX 2.2, opens the new Minipage dialog (figure 1) or extend their options (LaTeX). The only fiddly bit in the new Minipage dialog is deciding the correct percentage width.

You can have 

or a minipage in its own paragraph that



The LaTeX code for the first is:

```
% \framebox{\begin{minipage}[b][1\totalheight][t]{0.17\columnwidth}%
\begin{flushleft}
an in-line minipage that stands proud
\par\end{flushleft}%
\end{minipage}}
```

and for the second

```
\begin{center} %
\shadowbox{\begin{minipage}[t]{0.2\columnwidth}%
is centred and has a drop shadow.%
\end{minipage}}
\par\end{center}
```

In both these cases, height is calculated from the text but width has been entered as a fraction (percentage in LyX) of the total column width. See section 7.1 for how to colour the drop shadow.

Minipages can also be set side by side with space between them, in their own paragraph on a page or within a float (section 5.4), without a frame, with different styles of frame or with a shaded background:

*This is a frameless minipage with the text emphasised.*

This is a minipage with a red background.

Among the options for frames in LaTeX are:

| | |
|---|---|
| `\framebox` | a rectangular box |
| `\doublebox` | a rectangular box with a double rectangular frame |
| `\ovalbox` | a box with oval corners |
| `\Ovalbox` | a box with oval corners and a thicker frame |
| `\shadowbox` | a box with a drop shadow |

From LyX 2.2, LyX users can change the line thickness, box separation and shadow size in the new Minipage dialog. LaTeX users can change the default thickness of the frame (0.4pt) to, for example, 2 pts with

```
\setlength{\fboxrule}{2pt}
```

The default space around the text (3 pts) can be changed, for example, to 10 pts with

```
\setlength{\fboxsep}{10pt}
```

The size of the drop shadow can be changed, for example, to 5 pts with

```
\setlength{\shadowsize}{5pt}
```

Both LyX and LaTeX users wanting to change the rounding of the corners of an oval box have to use `\cornersize` either absolutely by setting a diameter with

```
\cornersize*{36pts}
```

or relatively by a entering a fraction which will be used against the shorter of height or width to calculate the diameter

```
\cornersize{0.4}
```

From LyX 2.2, you can also change the background colour[2] using the new Minipage dialog while LaTeX users need to enter:

```
\definecolor{shadecolor}{colour model}{colour values}
```

This minipage has a 2 pt frame and 12 pt separation ...

... while this has a background colour defined with

```
\definecolor{shadecolor}{rgb}{1,0.5,0.5}
```

### 2.3.1 Footnotes in a minipage

Minipages can have their own footnotes; these are numbered separately and appear at the bottom of the minipage. If you want the footnote to appear at the bottom of the page instead, see section 5.2.

| An example table | |
|---|---|
| An entry | A comment[a] |
| Another entry | Another comment[3] |

[a] A footnote to a table in a minipage

### 2.3.2 Variable width minipages

To insert a variable width minipage, go to Document ▷ Settings ▷ Modules and Add the Variable-width Minipages module in LyX 2.2. You can then insert a Minipage which adjusts to the width of its contents with Insert ▷ Custom Insets ▷ Minipage (Var. Width) and adjust its maximum width and its vertical adjustment with Insert ▷ Max. Width and Insert ▷ Vert. Adjustment.

You cannot however use any of the box or colour features which are available with standard minipages. You can only limit its width and vertical adjustment.

LaTeX users and users of earlier versions of LyX need to enter (in this instance)

[2] See section 7.3 for further information on changing colours.
[3] A footnote to a table at the bottom of the page

```
\begin{varwidth}{3in}
```

before the contents of the variable width minipage and

```
\end{varwidth}
```

after it.

## 2.4 Parboxes

A parbox is an alternative to a minipage: think of it as a way of enclosing a paragraph in a box. In LyX you select Insert ▷ Box but change the setting Inner box to Parbox. In LaTeX you use

```
\parbox[]{options}{%<your text>%}
```

You can use most of the same settings (LyX) or options (LaTeX) as you have for minipages but parboxes cannot have footnotes.

## 2.5 Fancy headers and footers

You can replace the standard headers and footers with your own by loading fancyhdr.[4] From LyX 2.2 you can select Document ▷ Settings ▷ Modules, then Custom Header/Footerlines and Add. Then select Document ▷ Settings ▷ Page Layout and change the Headings style to `fancy`; in LaTeX or in earlier versions of LyX add:

```
\usepackage{fancyhdr}
\pagestyle{fancy}
```

to the LaTeX Preamble.

You can then use the commands `\lhead{}`, `\chead{}`, `\rhead{}`, `\lfoot{}`, etc. in LaTeX or earlier versions of LyX to add your own headers and footers to each page. From LyX 2.2 you can use the six equivalent paragraph styles.

If you want your company logo to appear in the top left hand corner, the page number in the top right hand corner and the date in the bottom right hand corner of each page, enter in LaTeX or earlier versions of LyX:[5]

```
\lhead{\resizebox{1in}{!}{\includegraphics{logo.eps}}}
\rhead{\thepage}
\rfoot{\today}
```

The first of these depends on having the LaTeX `graphicx` package installed.[6]

If you have added the Custom Header/Footerlines module in LyX 2.2, see the example in section 4.6 for what to insert in the first paragraph style and enter the TeX code:

[4] KOMA-Script also provides the `scrpage2` package as an alternative to `fancyhdr`

[5] See section 4.4 for more information about `\resizebox` and how, from LyX 2.2, you can use the Resizebox Custom Inset for the first.

[6] LyX will have done this for you if there are other graphics in the body of the document; if not, add `\usepackage{graphicx}` to the LaTeX Preamble if you are not using the Resizebox Custom Inset.

```
\thepage
\today
```

into the second and third paragraph styles.

If you want to say 'page $n$ of so many pages,' you need to add

```
\usepackage{lastpage}
```

to the LaTeX Preamble and then replace `\thepage` with

```
\thepage\ of \pageref{LastPage}
```

By default, a title page is `empty` or `plain` depending on the document class. To add your logo to the title page, enter `\thispagestyle{fancy}` after `\maketitle`. If you do not want the headers or footers to appear on a later page, enter `\pagestyle{empty}` or `\pagestyle{plain}`, which will give you the standard page numbers, and then `\pagestyle{fancy}` if you want them back again.

To make the headers and footers alternate so that they are always on the inside or outside of the page in a two-sided document in LaTeX or any version of LyX use something like:

```
\fancyhead{} % clear all header fields
\fancyhead[LE,RO]{\resizebox{1in}{!}{\includegraphics{logo.eps}}}
\fancyfoot{} % clear all footer fields
\fancyfoot[LE,RO]{\thepage}
\renewcommand{\headrulewidth}{0.4pt}
\renewcommand{\footrulewidth}{0.4pt}
```

`LE` stands for Left Even page, `RO` for Right Odd page and `C` for Centre. By default you get a thin rule below the headers and above the footers but, after resetting them, you need to redefine the rule. You can change the thickness of each rule by issuing the last two commands with a changed value; a value of 0 turns them off.

You can remove headers and footers from pages of floats or from pages which contain a top or bottom float with `\iffloatpage{<float page value>}{<other pages value>}` or `\iftopfloat` and `\ifbotfloat` which take similar parameters. For more information, download the fancyhdr documentation.

## 2.6 Short titles

By default the chapter and section headings generated for the headers are simply the text of the chapter or section title. But, if this is long or if you want to identify a chapter by its author rather than its title, for example, in an edited collection, you can add a short/alternative title in LyX with Insert ▷ Short Title which is displayed in the running headers and as the bookmark in a PDF.

To create a short title for a section in LaTeX enter

```
\section[short title]{long title that goes on and on and on ...}
```

## 2.7 An example of minipage use

# What is new in LyX 2.0?

The following (text from http://wiki.lyx.org/LyX/NewInLyX20) illustrates using minipages within and outside columns and another change to the shade colour.

**Advanced Search Facility**
Tommaso Cucinotta has contributed a very much desired feature: Searching with format consideration. With this tool, you can insert everything in the search bar that can be inserted into the LyX window: formatted characters, math, insets, etc. You can also replace existing text with formatted text, including searching for mathematics and replacing with mathematics. Finally, you can also search for paragraph styles.

**Compare Documents**
Vincent van Ravensteijn implemented a document comparison feature. Go into Tools->Compare ... provide the two documents that you want to compare, and LyX now creates a new document that highlights the changes

**Spell-checking on the fly**
Abdelrazak Younes implemented a long-requested feature: in-line spell checking. While implementing this, he also redesigned large parts of the existing spell checking code and user interface, addressing many long-standing problems.

**Multilingual Thesaurus**
LyX's thesaurus was very limited and restricted to English only, since no other dictionaries existed for the library we used (Aiksaurus). Now Jürgen Spitzmüller has introduced support for the MyThes thesaurus library, which has been included into LyX itself. Since MyThes is what OpenOffice uses, LyX can now deal with OpenOffice thesauri, which exist in many languages.

**Table features**
The table handling was improved by Vincent van Ravesteijn, Uwe Stöhr, Edwin Leuven and Abdelrazak Younes:

- The table dialog has been polished.
- The vertical position of tables can now be specified.
- The horizontal alignment of longtables can now be specified.
- It is now possible to define multi-row table cells.
- Easy alignment of columns on a character of your choice (like a decimal point).

# 3 Paragraph options

## 3.1 Hanging paragraphs

To have hanging paragraphs in LyX, go to Document ▷ Settings ▷ Modules, select Hanging and press Add. You then get a new paragraph style — Hanging — which you can use wherever you want to have a hanging paragraph. (Note that the hanging paragraph is indented in LyX and only appears as a hanging paragraph in the output.)

LyX uses the `hanging` package to define a single hanging paragraph style for LyX; LaTeX users need to use the same package but read the documentation to determine how they wish to use it.

## 3.2 Mini-sections

Sometimes you want to add a heading to some text without starting a new section or subsection. For example, you might want to split a recipe into the list of ingredients followed by the method. KOMA-Script offers the `minisection` paragraph style to enable you to achieve this. Unlike the `paragraph` and `subparagraph` styles, it is not merged with the subsequent paragraph.

### Ingredients

6 oz. margarine
6 oz. caster sugar
Few drops of vanilla essence
3 large eggs
6 oz. self-raising flour
1–2 tblsp. hot water

### Method

Beat margarine and caster sugar until light and fluffy; add vanilla. Whisk eggs, add to mixture and beat; add flour and beat. Add 1–2 tblsp. hot water to form soft dropping consistency.

Makes 24 cakes; bake at 190°C/375°F/Gas 5 for 15–20 minutes.

## 3.3 Bullets and numbering

In LaTeX you can change the default bullets by redefining `\labelitemi-iv` with a command like

```
\renewcommand\labelitemi[0]{\small\(\diamond\)}
```

In LyX you can make a permanent change with Document ▷ Settings ▷ Bullets and, for example, selecting the diamond shape so that

- ◇ you get a diamond bullet.

To make a temporary change, as I have done here, enter:

```
\let\savelabelitemi=\labelitemi
\renewcommand\labelitemi[0]{\small\(\diamond\)}
```

before the example and

```
\renewcommand\labelitemi[0]{\savelabelitemi}
```

after the example in order to restore the default bullet. Note that, to obtain a wider choice of symbols, you may have to install additional, normally maths, packages; see The comprehensive LaTeX symbol list.

In both LyX and LaTeX you have to use LaTeX code to change the default enumerators 1., a), i), A. You have a choice of five, Arabic numerals, upper and lower case Roman numerals and upper and lower case Roman letters, signified by `\arabic{}`, `\Roman{}`, `\roman{}`, `\Alph{}` and `\alph{}`. The four levels are `enumi` to `enumiv`; so altering the sequence to 1., (i), (a), I. can be achieved with:

```
\renewcommand{\labelenumi}{\arabic{enumi}.}
\renewcommand{\labelenumii}{(\roman{enumii})}
\renewcommand{\labelenumiii}{(\alph{enumiii})}
\renewcommand{\labelenumiv}{\Roman{enumiv}.}
```

in both LyX and LaTeX.

3.1. You can also obtain paragraph numbering within a section by adding `\thesection.` to the top level numbering style; for example,

```
\renewcommand{\labelenumi}{\thesection.\arabic{enumi}.}
```

3.2. Like the other custom numbering styles, this will not show in LyX.

3.3. In this example, the first 3 in the PDF output refers to section 3. Normally, you would start such paragraph numbering at the start of the section rather than near the end!

## 4 Text enhancements

Text in boxes can also be manipulated in a variety of ways. LaTeX users may need to add the `graphicx` package with

```
\usepackage{graphicx}
```

It is normally added whenever a LyX user chooses an enhancement which requires it but users can check whether it has already been added with View ▷ Source pane; select `Preamble only` to inspect the list of packages at the start of the document. If it is not present, add it to the LaTeX Preamble but check the source again later in case LyX has added it as a result of using a feature.

From LyX 2.2, for subsections 4.3 to 4.6, LyX users should go to Document ▷ Settings ▷ Modules, select the GraphicBoxes module and Add it to the document. For earlier versions of LyX, users will need to use the LaTeX commands in these subsections.

## 4.1 Drop capitals

To add drop capitals in LyX, go to Document ▷ Settings ▷ Modules, select Initials and press Add. You then get a new paragraph style — Initials — which you can use wherever you want to have drop capitals. You then have three more items in the Insert menu:

- Initial which creates an inset for the drop capital
- Rest of initial which creates an inset for the rest of the word
- Options which allow you configure the formatting of the drop capital.

LaTeX users should add `\usepackage{lettrine}` to the LaTeX Preamble and then specify the drop capital — using the example above — with

```
\lettrine{T}{o}{add drop capitals in ... menu:}
```

## 4.2 Frames and coloured backgrounds around one or more words

From LyX 2.2 you can draw a box around Great Western Railway, highlight text or put a frame around the highlighted text using the new Insert ▷ Box dialog (figure 1).

The first is created in LaTeX with

```
\fbox{Great Western Railway}
```

which looks like

\fbox{ Great Western Railway }

in earlier versions of LyX.

The second and third are created with `\colorbox{yellow}{highlight}` and `\fcolorbox{green}{yellow}{highlighted}` which look like

\colorbox{yellow}{ highlight }

\fcolorbox{green}{yellow}{ highlighted }

in earlier versions of LyX.

## 4.3 Rotating text

Text can be rotated in LaTeX with

```
\rotatebox[rotation origin]{rotation angle}{box content}
```

where the `origin` is specified as `c`, `l`, `r`, `b`, `t` or meaningful combinations of these and the counterclockwise rotation angle is expressed in degrees.

From LyX 2.2, once you have installed the GraphicBoxes module, select Insert ▷ Custom Insets ▷ Rotatebox where you want the rotated box to appear and Insert ▷ Origin to add an Origin option. Entering '=c' in the Origin box, '30' in the Angle box and 'Great Western Railway' after the Angle box looks like this in LyX 2.2:


and produces:


LaTeX users and LyX users using earlier versions should enter

```
\rotatebox[origin=c]{30}{Great Western Railway}
```

where they want the box to appear.

This also offers a way of rotating figures and tables outside a float:

| An example table | |
|---|---|
| An entry | A comment |
| Another entry | Another comment |

## 4.4 Scaling text

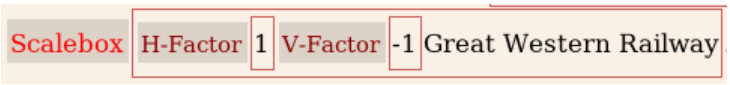
Text can be scaled in LaTeX with

```
\scalebox{h-factor}[v-factor]{box content}
```

If the vertical factor is omitted, the horizontal is used. So `\scalebox{2}{Great Western Railway}` gives Great Western Railway. Adding different horizontal and vertical values creates distortion as in `\scalebox{2}[1.5]{Great Western Railway}` which gives Great Western Railway.

A negative horizontal value reverses the text and a negative vertical value inverts it so that you get ʎɐʍlıɐЯ ɹǝʇsǝM ʇɐǝɹƆ and Great Western Railway.

These were created in LyX 2.2 with Insert ▷ Custom Insets ▷ Scalebox and Insert ▷ V-Factor to add a V-Factor option and by entering '-1' in the H-Factor box, '1' in the V-Factor box and 'Great Western Railway' after the V-Factor box in the first inset and the opposite values in the second — which looks like this in LyX:




LaTeX users and LyX users using earlier versions should enter

```
\scalebox{-1}[1]{Great Western Railway}
\scalebox{1}[-1]{Great Western Railway}
```

Had the vertical value not been added to the first, it would have taken the horizontal value and been inverted as well.

## 4.5 Reflecting text

A simpler way of reversing text without any other enhancement is to use the Reflectbox which is inserted in LyX 2.2 in the same way as a Rotatebox or a Scalebox: yawliaR nretseW taerG.

LaTeX users and users of earlier versions of LyX should enter

```
\reflectbox{Great Western Railway}
```

## 4.6 Resizing text

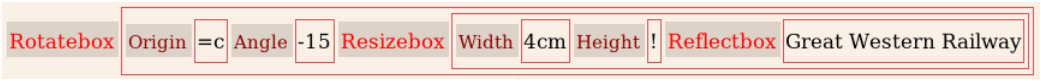
For more precise scaling in LaTeX `\resizebox{width}{height}{box content}` allows you to specify the dimensions of the text or image; if you substitute `{!}` for `{height}` it scales by the width factor.

These commands can be combined so that, for example,

```
\rotatebox[origin=c]{-15}{\resizebox{2cm}{!}{\reflectbox{
Great Western Railway}}}
```

produces: 

In LyX 2.2 this looks like:




This is what the logo from the example in section 2.5 would look like 

and this is what you would see in LyX 2.2:

Table 1: Putting footnotes in a float using TEX code

| An example table | |
|---|---|
| An entry | A comment |
| Another entry | Another comment[7] |

# 5 Floats

## 5.1 Altering the type-style of captions

To change the type-style of captions to bold add the command

```
\usepackage[labelfont=bf]{caption}
```

to the LATEX Preamble unless you are using KOMA-Script in which case the command is:

```
\setkomafont{captionlabel}{\bfseries}
```

For more information on these options look at the caption or KOMA-Script documentation.

## 5.2 Footnotes in floats

Strictly speaking you cannot use footnotes in a float but there are a number of workarounds:

- put the table or image in a minipage (section 2.3.1)
- use a longtable instead of a table float (section 6.6)
- add LATEX code to achieve your objective (table 1).

To do the third, enter `\footnotemark{}` where you want to footnote number to appear and enter `\footnotetext{<your text>}` after the table. In LYX this will look like:

`\footnotetext{` `<your text>` `}`

You may also have to enter Insert ▷ Formatting ▷ Clear Page in LYX to make sure the footnote appears on the same page as the float.

## 5.3 Table captions

TEX does not support the convention that table captions in floats appear above tables and figure captions beneath figures; so it does not insert a gap between the table caption and the table. To ensure that it does, enter

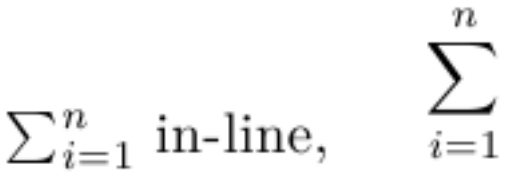
```
\usepackage[tableposition=top]{caption}
```

in the LATEX Preamble unless you are using a KOMA-Script document class. In this case, add `captions=tableheading` to the Custom Class Options in Document ▷ Settings ▷ Document class in LYX or use

```
\documentclass[captions=tableheading, ...]{}
```

in LATEX.

[7] A footnote to table 1



(a) In-line formula (b) Display formula

Figure 2: A pair of sub-floats each with their captions

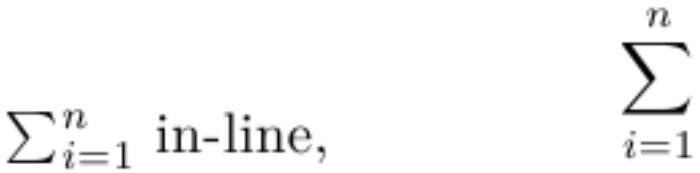


Figure 3: In-line formula



Figure 4: Display formula

Figure 5: A pair of minipages each with their captions

### 5.4 Sub-floats

You can place two images in a float by using sub-floats (Figure 2) or by using two minipages (Figure 5). In each case, they have been collectively centred and one quad of space has been placed between them. Note that, whether containing figures or tables, sub-floats are numbered at the second level whereas minipage captions (created using the `\captionabove` and `\captionbelow` environments which are available in the LyX drop down list) have top level numbering (Table 2).

You can also put a table and its graph inside the same float by putting them inside two minipages. If you put them in subfloats, they will have second level numbering (Table 2).

## 6 Tables

### 6.1 Formal tables

Formal tables (Table 3) are obtained in LyX through Settings ▷ Borders ▷ Style and in LaTeX by substituting `\midrule` for `\hline` in the table description.

### 6.2 Changing the line attributes of tables

How you change the line attributes of tables varies depending on the change you want to make. If you want to change the width of all the lines in a table to 1.5pt as in Table 4, you can do this by entering

```
\setlength{\arrayrulewidth}{1.5pt}
```

Table 2: Development of ethnic awareness in pakeha and Maori children

(a) stages in development

| | pakeha (white) | Maori |
|---|---|---|
| self identification | 4 years old | 9–10 years old |
| discrimination | 5–6 years old | 5–10 years old |
| classification | 7–12 years old | 7–12 years old |

(b) Own group preferences

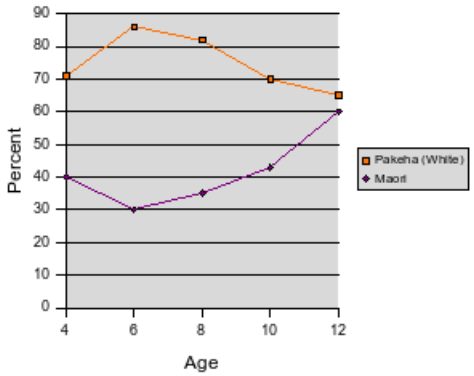



Table 3: This is a formal table

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

Table 4: Thick lines

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

before the table and

```
\setlength{\arrayrulewidth}{0.4pt}
```

(which is the default) after it.

However, if you want to make different changes to the vertical and horizontal lines, you have to remove the default vertical lines and replace them with newly defined lines whereas you can simply change the attributes of the default horizontal lines.

### 6.2.1 Vertical[8]

You can define as many different vertical lines as you want in the LaTeX Preamble with

```
\newcolumntype{<name>}{!{<definition>}}
```

So, for example, you might want the vertical lines in a table to be thicker or coloured. To achieve the first, you need a definition like

```
\newcolumntype{E}{!{\vrule width 1.5pt}}
```

and, to achieve the second, a definition like

```
\newcolumntype{B}{!{\color{blue}\vline}}
```

You can then use `E` and `B` in the LaTeX arguments of the table definition. For Table 5 in LyX clear the vertical lines from the table, put the cursor in the first cells of the columns and enter `Bc Ec` and `BcB` respectively in Settings ▷ Table settings ▷ LaTeX argument. In this case, the tabular argument in LaTeX is `{BcEcBcB}`.

### 6.2.2 Horizontal

To change only the horizontal line attributes of a table such as Table 6, place TeX code similar to this before the table

[8] Thanks to the LyX Documentation Team for the examples in this and the next section and for being the inspiration to explore several of the other tricks in this paper.

Table 5: Changing vertical line attributes

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

Table 6: Coloured horizontal lines

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

```
\let\myHlineC\hline
\renewcommand{\hline}{\arrayrulecolor{red}\myHlineC\arrayrulecolor{black}}
```

and TEX code similar to this after the table

```
\renewcommand{\hline}{\myHlineC}
```

## 6.3 Multirow tables

Multirow tables are supported in LYX (Table 7); LATEX users need to add

```
\usepackage{multirow}
```

in the LATEX Preamble and, for example, insert

```
\multirow{2}{2.8cm}{<your text>}
```

in the table cell.
By default `multirow` formats the cell ragged right; you can change this behaviour with

```
\renewcommand{\multirowsetup}{\centering}
```

Replace `\centering` with `\raggedleft` or `\raggedright` as appropriate.

Table 7: Multirow table

| Row 1 Column 1 | Row 1 Column 2 |
|---|---|
| Row 2 Column 1 | Row 2 Column 2 |
| | Row 3 Column 2 |

## 6.4 Long words in narrow cells

If you give a column a fixed width, LaTeX will wrap the contents of the cell. However, TeX will not hyphenate the very first word in a cell:

| Narrow column | Column with undefined width |
|---|---|
| exceptionally long word | other words |

You can get round this by inserting a space of 0 length before the word with Insert ▷ Formatting ▷ Horizontal space ▷ Custom ▷ 0 in LyX:

| Narrow column | Column with undefined width |
|---|---|
| exceptionally long word | other words |

```
\hspace{0in}
```

in LaTeX will do fine.[9]

## 6.5 Captions in longtables

You can insert a caption in a longtable using the Settings ▷ Longtable dialogue in LyX and `\caption{}` in LaTeX.

Table 8: This is my longtable caption

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

[9] The same trick works with margin notes that begin with a long word.

**Note:** LaTeX increments the table counter for each longtable; if you do not want longtables without captions to be counted add

```
\addtocounter{table}{-1}
```

after each longtable that you do not want counted.

Also, the caption width will be set to the lesser of the column/page width and the caption width; if you do not want the caption to spill over the width of the table, you need to enter a suitable value with

```
\setlength{\LTcapwidth}{width}
```

Table 9: This long caption would have filled the whole column width if I had not used `\setlength{\LTcapwidth}{8 cm}`

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

## 6.6 Footnotes in longtables

As you cannot, strictly speaking, use footnotes in floats, one option is to use a longtable instead (table 10).

Table 10: This is a longtable with a footnote

| | Name | Email[10] |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

[10] This is my longtable footnote

# 7 Colour

## 7.1 Coloured text

The `color` package offers red, green, yellow, blue, cyan, magenta, black and white. It is automatically added to the LaTeX Preamble by LyX if you create any coloured text using Edit ▷ Text style ▷ Customized ▷ Color but LaTeX users need to add

```
\usepackage(color)
```

to the LaTeX Preamble. In LaTeX the coloured text above can be created with

```
\textcolor{red}{any} \textcolor{green}{coloured}
\textcolor{blue}{text}
```

From LyX 2.2 the following additional colours are predefined in LyX: brown, darkgray, gray, lightgray, lime, olive, orange, pink, purple, teal and violet. LaTeX users need to define these themselves — see subsection 7.3.

You can also use `\textcolor{red}` before a box with drop shadow and `}` after it in both LyX and LaTeX to create a red drop shadow.

## 7.2 Changing the colour of hyperlinks

Full support for hyperlinks is provided by the LaTeX `hyperref` package; LyX users can enable this by selecting `Use hyperref support` in Document ▷ Settings ▷ PDF Properties and LaTeX users by adding `\usepackage{hyperref}` to the LaTeX Preamble.

In LyX Insert ▷ Hyperlink allows you to set a target and the name of the link separately so that, unlike URLs, all the gory detail is hidden. In LaTeX this is achieved by adding one of a web address, an email or a filename before the name of the link which will appear in the text:

```
\href{http://www....}{name}
\href{mailto:<email address>}{name}
\href{file:<filename>}{name}
```

To alter the default settings LyX users go to Document ▷ Settings ▷ PDF Properties ▷ Hyperlinks where they can opt to break links over lines, remove the default boxes around each link and use colour links. LaTeX users add the relevant options to the list of parameters in `\hypersetup`; the first is enabled with `breaklinks=true`, the second with `pdfborder=0 0 0` and the third with `colorlinks=true`.

To change the default colours of links, LyX users insert parameters as an `Additional option` and LaTeX users add them to the list of parameters in `\hypersetup`; the default colours are:

| | | |
|---|---|---|
| `linkcolor` | `red` | normal internal links |
| `citecolor` | `green` | bibliographical citations [11] |
| `filecolor` | `cyan` | URLs which open local files |
| `menucolor` | `red` | PDF menu items |
| `urlcolor` | `magenta` | external URLs |

For example, the options in this document are:

```
linkcolor=black,citecolor=black,urlcolor=blue
```

For more information, see the hyperref documentation.

## 7.3 Extending the available colours

If you want to extend the available colours, you can define your own colours by adding

```
\usepackage{colortbl}
```

and one of the following to the LaTeX Preamble for each of the colours you want to define:

```
\definecolor{colour name}{cmyk}{colour values}
\definecolor{colour name}{rgb}{colour values}
\definecolor{colour name}{gray}{colour value}
```

The colour values are comma separated in the range 0–1.[12]

This is an example of a centred minipage with a light grey background defined in the LaTeX Preamble with `\definecolor{light grey}{gray}{0.85}`.

## 7.4 Colour in tables

Text in a table can be coloured as described in section 7.1. To colour backgrounds, you can place the entire table in a frameless minipage which has a background colour (section 4.2) or install the `colortbl` package. You can then change the background colour with `\columncolor{}`, `\rowcolor{}` or `\cellcolor{}` where the colour options are those available with the `color` package as well as those set out in section 7.3.

To colour the first column in Table 11 I put the cursor in the first cell of the column, selected Settings ▷ Table settings ▷ LaTeX argument in LyX and entered

```
>{\columncolor{cyan}}c
```

In LaTeX it goes in the arguments after `\begin{tabular}`. The full LaTeX argument for the three columns is:

```
{|>{\columncolor{cyan}}c|>{\columncolor{yellow}}c|>{\columncolor{green}}c|}
```

[11] It is recommended that you use the `natbib` citation styles with `hyperref`.
[12] For more information, download colortbl.pdf.

Table 11: Background colours

| | Name | Email |
|---|---|---|
| 1 | James | jimmy287@bigphoneco.com |
| 2 | Andrew | andy3@littlephone.co.uk |
| 3 | Margaret | mags.forrest@mylocalip.co.uk |
| 4 | Jean | jean15@mylocalip.co.uk |
| 5 | Rose | rose.smith@littlephone.co.uk |
| 6 | David | davyjones3@bigphoneco.com |

which LaTeX users enter as a single command and LyX users as three separate commands in the LaTeX arguments for the first cells of each column. Row colours override column colours and cell colours column and row colours. I entered the row and cell colours directly in each cell with `\rowcolor{red}` in the first cell of the first row and `\cellcolor{magenta}` in the last cell of the last row.

LyX users need to beware that changing the text colour needs to be done last so as not to create LaTeX syntax errors. This means that, if a coloured table is the first coloured element you are entering in a document, you either cannot preview the table until you have inserted some coloured text (and LyX has inserted the `color` package) or you have to enter `\usepackage{color}` in the LaTeX Preamble to view the table and then delete this entry before you insert the first coloured text.

## 8 Checking the typesetting

In KOMA-Script adding the option `draft=true` to Document ▷ Settings ▷ Document Class ▷ Custom in LyX or `\documentclass[...]{}` in LaTeX will create a PDF without the graphics but with black rectangles at the ends of lines needing manual attention.