The LyX User's Guide

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Contents

Contents

Contents

Contents

Contents

1. Getting Started

1.1. What is LyX?

LyX is a document preparation system. It is a tool for producing beautiful manuscripts, publishable books, business letters and proposals, even poetry. It is unlike most other "word processors" in the sense that it uses the paradigm of a markup language as its core editing style. That means that when you type a section header, you mark it as a "Section", not as "Bold, 17 pt type, left justified, 5 mm space below". LyX takes care of the typesetting for you; so you deal only with concepts, not with mechanics.

This philosophy is explained in greater detail in the *Introduction* manual. If you haven't read it yet, you need to. Yes, we mean now.

The *Introduction* manual describes several things in addition to LyX's philosophy: most importantly, the format of all of the manuals. If you don't read it, you will have a difficult time navigating the manuals. Additionally it provides a high level content description of the other manuals giving the user an idea of where to look for specific information.

1.2. How LyX Looks

Like most applications, LyX has the familiar menu bar across the top of its window. Below it is a toolbar with a pulldown box and various buttons. There is of course a work area for editing documents complete with a vertical scrollbar.

Note that there is no horizontal scrollbar. This is not a bug or an oversight, it is intentional. When you read a book, you expect the end of a line to wrap around to the next line. Text overflows onto new pages in a vertical fashion, hence the need for only a vertical scrollbar.

There are three cases where you might want a horizontal scrollbar. The first case is large images. To avoid images being displayed larger than your screen, left click on the image and use the option Scale on Screen in the tab LaTeX and LyX options. The second and third cases are tables and equations which are wider than the LyX window. You can use the arrow keys to scroll horizontally through both.

For a brief description of all LyX menus and toolbar buttons, have a look at Appendix A.

1.3. HELP

The help system consists of the LyX manuals. You can read all of the manuals from inside LyX. Just select the manual you want to read from the Help menu.

1.4. Basic LyX Setup

Almost all features of LyX can be configured via the menu Tools ▷ Preferences. LyX is able to inspect your system to see what programs, LaTeX document classes, and LaTeX packages are available. It uses this knowledge to give reasonable defaults for the preferences settings. Although this configuration was performed when LyX was installed on your system, you might have some items that you installed locally, e. g. new LaTeX classes, which are not seen by LyX. To force LyX to re-inspect your system use Tools ▷ Reconfigure. Then restart LyX to ensure that the changes are taken into account.

1.5. LaTeX Setup

You can edit documents in LyX without having LaTeX installed but you will not be able to create PDFs. Even without LaTeX every LyX document can still be output as plain text, as Docbook or as XHTML.

Some document classes may depend upon specific LaTeX classes or packages. Such document classes can be used even if you do not have the required files installed, but you will not be able to produce certain kinds of output.

The LaTeX packages that LyX finds on your system are listed in a file you can view from the menu Help ▷ LaTeX Configuration. If you are missing needed packages then you must install them and then reconfigure LyX (menu Tools ▷ Reconfigure). See section *Installing new LaTeX files* in the *Customization* manual for more information on installing additional LaTeX packages.

2. How to work with LyX

2.1. Basic File Operations

Under the File menu and in the standard toolbar are basic operations common to any word processor as well as some more advanced operations:

- New, Ctrl+N or
- New from Template, Ctrl+Maj+N
- Open, Ctrl+O or
- Open Recent
- Open Example
- Close, Ctrl+W
- Close All
- Save, Ctrl+S or
- Save As, Ctrl+Maj+S
- Save As Template
- Save all
- Revert to saved
- Exit, Ctrl+Q

They all do pretty much the same thing as other word processors, with a few minor differences. The File ▷ New from Template command lists the available templates. Selecting a template will automatically set certain layout features and possibly propose text fragments for the document, features and text you would otherwise need to set or enter manually. They can be of use for certain classes, especially those for writing letters (see section 3.1.2). You can also add your own templates to this list by means of storing a LyX file with the File ▷ Save As Template function.

Note: There is no "default file" or document named "Untitled" or "scratch." Unless you tell LyX to open a file or create a new one, that big blank space on the screen is just that — a big blank space.

Revert to saved and **Version Control** are useful if multiple people work on the same document at the same time.[1] **Revert to saved** will reload the document from disk. You can of course also use it if you regret that you changed a document and want to restore it to the last saved version. With **Version Control** you can register the changes you made to a document so that others can identify them as your changes.

2.2. Safety Nets: Rescuing Files If Things Go Awry

LyX lays much stress on safety. We know how much effort you invest in your work, and thus the last thing we want is that this work gets lost. However, we cannot completely prevent bad things from happening: LyX might crash (although we put in all effort that it doesn't), you might face a power outage while you are working on a document with unsaved changes, disks might get corrupt or files might get lost or damaged during synchronization or simply because you deleted it by mistake. For such cases, LyX provides a multi-layered safety net that will hopefully prevent you from major hassles. This means that LyX does not simply make a backup file, it makes several such files that might be useful in different scenarios. Parts of this multi-layered net can be switched off, if you prefer to go a bit more risky over having multiple files (see section C.1.2.2), but all measures are on by default to provide you with most possible security.

In what follows, we elaborate on the diverse files and when they might become useful.

2.2.1. Backup Files

By default, LyX makes backup copies of files when they are saved. Normally, these files are stored in the same directory than the original file and with the same file name but the extension `.lyx~` (e. g., `myfile.lyx~`). If you prefer to have all backups in a central place (and maybe on a separate disk), you can specify a **Backup Path** in preferences (see section C.3), then all backups are stored there. In order to prevent file name clashes, the files then do not simply have the original file name, but also the path in their name, separated by "!" (e. g., `!home!paula!work!myfile.lyx~`).

Note that some file managers hide backup files by default, and you need to enable "Show hidden files" in order to see them.

Backup files provide the latest saved version of a document. They are never deleted by LyX, but overwritten if new changes are saved in the original file.

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[1]If you plan to do this, you should check out the Version Control feature in LyX. Refer to section *Version Control in LyX* in the *Additional Features* help manual.

2.2.2. Auto-Save Snapshots

By default, LyX also makes automatic snapshots of all opened documents that have unsaved changes in a regular time interval (which can be adjusted in preferences, see section C.1.2.2). As opposed to the backup files, these also contain unsaved changes and thus might be newer than the backups.

These files are always stored in the same directory than the original file and with the same name, but embraced by "#" (e. g., `#myfile.lyx#`). Auto-save snapshots are deleted when a document is closed normally, i. e., with all changes saved. They are left on disk in case of non-normal termination (e. g., program crash or power outage), and this is when they might become useful.

2.2.3. Emergency Files

If LyX crashes and documents have unsaved changes, the program furthermore tries to write an emergency file, which is a version of the document containing all unsaved changes, even those that have been made after the latest snapshot.

These files are always stored in the same directory than the original file and with the same name but the extension `.lyx.emergency` (e. g., `myfile.lyx.emergency`). When the respective document is reopened with LyX next time, the application recognizes the emergency file and asks you whether it should try to recover your file to that last state. If you agree, it will do so, and if this succeeds it will ask you next whether the emergency file can be deleted. Agree on this only after you checked that everything has been correctly recovered!

2.2.4. Backup Files from Old LyX Versions

If you open a LyX document for the first time with a new major version of LyX, it gets converted to the new file format (allowing for new features). In such cases, LyX keeps a copy of the old version, named as `<filename>-lyxformat-<n>.lyx`, where `<n>` is the old format (e. g., `myfile-lyxformat-474.lyx`). Those files are stored at the same location than the backup files, that is alongside the original document or, if specified, in the backup directory.

As with backup files, these files are never deleted by LyX.

2.2.5. When to Use Which File?

Now why all these files? Because they have different purposes. Generally spoken:

If LyX terminates unexpectedly,

1. first try to restore from the emergency file (by reopening the document in L_YX). This file has the latest changes, even changes you made after the last auto-save snapshot has been made.

2. If the rescue file way did not work because there is no rescue file (e. g., after a power outage) or the rescue file is damaged (it might happen in mean cases that the rescue files contains just that latest addition that makes L_YX crash!), look if there is an auto-save snapshot. If so, remove the trailing # so that the file can be opened with L_YX (not the first # in order to keep the original file until you checked the snapshot) and see if that works for you. If so, you will have lost five minutes of work in the worst case (with the default settings at least).

3. If there is no auto-save snapshot or this one is garbled as well, use the backup file. It does not have all the unsaved changes, but it might still be the most recent you can get. This is particularly the case if the original file itself got lost or is damaged.

The fourth type of file, the backup file from old versions, is useful if the conversion process did not work and results in a non-working document (although we put in all efforts to prevent this) or if you mistakenly opened and saved a document with a newer version (such as a development version) and actually want to keep on using the old version.

So much for the safety net. We hope you will not need it, but if so, that it catches you as high up as possible. Now let us return to the actual writing process.

2.3. Basic Editing Features

Like most modern word processors, L_YX can perform cut and paste operations on blocks of text, can move by character, word, or page of text, and can delete whole words as well as individual characters. The next four sections cover the basic L_YX editing features and how to access them. We will start with cut and paste.

As you might expect, the Edit menu and the standard toolbar have the cut and paste commands, along with various other editing features. Some of these are special and covered in later sections. The basic ones are:

- Cut, Ctrl+X or ✂
- Copy, Ctrl+C or 📋
- Paste, Ctrl+V or 📋
- Paste Recent
- Paste Special

- Find & Replace, Ctrl+F or ⚲

The first three are self-explanatory. You can also copy text between LyX and other programs using Cut, Copy and Paste. Cut and Copy put two versions of text into the clipboard (formatted and unformatted) so that other programs can choose the most suitable form. Paste supports formatted and unformatted text as well as graphics. It tries to interpret the clipboard contents in an intelligent way. For example if the clipboard contains text in a Comma Separated Values (CSV) format and the cursor is inside a table, the text will be pasted into individual cells. The submenu of Paste Recent shows you a list of the last several strings you have pasted. You can insert one at the current cursor position by clicking on a list entry.

The submenu Paste Special may also contain optional items for specific formats depending on the clipboard contents. Possible formats include HTML, LaTeX, PDF, Linkback PDF[2], PNG, JPEG and EMF. These menu items are useful if the clipboard contains the same contents in different formats and you want to select one format explicitly. (E. g. some programs put an image into the clipboard as graphics and as a short text which is often meaningless.)

The menu item Paste Special ▷ Plain Text, Join Lines is equivalent to Paste with the only difference being that it acts on text only. It will paste the text in the clipboard such that the whole text selection is inserted as one paragraph. A new paragraph is only started where there is a blank line in the text. Without Join Lines, line breaks in the text will start a new paragraph. This is useful when copying contents of tables from webpages to a table in LyX. The items Paste Special ▷ Selection, Join Lines and Paste Special ▷ Selection paste from the primary selection. This is normally the currently selected text.

The Edit ▷ Find & Replace item opens the Find and Replace widget. Once you have found a word or expression, LyX selects it. You can click the Find > button (or the Return key or the F3 shortcut) to skip the currently selected word, or < Find (or Shift+Return or the Maj+F3 shortcut) to search backwards. Even if you close the widget, F3 and Maj+F3 will search further.

Hitting the Replace button replaces the selected text with the contents of the Replace with field and searches the next match. Hit Replace All to replace all occurrences of the text in the document automatically.

Furthermore, the following options are available:

- Case sensitive can be used if you want the search to consider the case of the search word. If the toggle is set, searching for "Test" will not match the word "test".

- Whole words can be used to force LyX to only find complete words, e. g. searching for "star" will not match "starlet".

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[2]OS X only

- **Selection only** will limit search and replace, or replace all, to the current cursor selection.

- **Search as you type** starts searching (forwards) immediately on input, without pressing the Find > key.

- **Wrap** starts from the beginning/end of the document if the end/beginning has been reached without asking. If this is not checked, a dialog will pop up asking you what to do. Note that responding to this dialog makes the cursor leave the search widget, so you need to put it back manually.

The widget also has a **Minimize** button that lets you shrink the widget to only the first row (the search widget), hiding replace and options. If done so, an **Expand** button brings you back to the full size.

LYX also offers an advanced **Find & Replace** feature that is described in section 6.14.

Things like notes, floats, etc. (the so called "insets") can be dissolved. This means that the inset is deleted and its content is left as normal text. Dissolving an inset is done by setting the cursor to the beginning of an inset and pressing **Backspace** or by setting the cursor to the end and pressing **Delete**.

Using the shortcut **Ctrl+A** while the cursor is in normal text selects the whole document. When the cursor is inside an inset **Ctrl+A** selects the content of the inset. Using **Ctrl+A** consecutively will increase the selection scope to the whole inset and then to the whole document. The shortcut **Ctrl+Alt+A** selects the whole document in every case and puts the cursor to the end of the document.

2.4. Undo and Redo

If you make a mistake, you can easily recover from it. LYX has a large-capacity undo/redo buffer. Select **Edit ▷ Undo** or the toolbar button ↶ to undo a mistake. If you accidentally undo too much, use **Edit ▷ Redo** or the toolbar button ↷ to "undo the undo." The undo mechanism is currently limited to 100 steps to minimize memory overhead.

Undo and **Redo** work on almost everything in LYX. However they will not undo or redo text character by character, but by blocks of text.

2.5. Mouse Operations

These are the most basic mouse operations.

1. Motion

- Click the *left mouse button* once anywhere in the edit window. The cursor moves to the text under the mouse.

2. Selecting Text

   - Hold down the *left mouse button* and drag the mouse. LyX highlights the text between the old and new mouse positions. Use Edit ▷ Copy to create a copy of the text in LyX's buffer (and the clipboard). You can also use the context menu triggered by right clicking on the selected text.

   - Re-position the cursor and then paste the text back into LyX using Edit ▷ Paste.

3. Insets (Footnotes, Notes, Floats, etc.)

   Right-click on them to set their properties. Check the appropriate section of this manual for more details.

2.6. Navigating

LyX offers you several ways to navigate in documents:

- The Navigate menu lists all sections of the document as submenu entries that you can click to jump to the corresponding document part.

- The "Outline", which is accessed either by the menu View ▷ Outline Pane or by the toolbar button ⊗.

- You can set bookmarks in your document under Navigate ▷ Bookmarks and use the same menu to return to them. Note that bookmarks are saved between sessions.

The toolbar button ⇐ (also Navigate ▷ Bookmarks ▷ Navigate Back) jumps to the position in the document where you recently changed something. This is useful when you have a large document and have navigated or scrolled to another document part to look for something and want to go back to your last editing position.

By pressing the F5 key the cursor will be vertically centered in LyX's main window.

2.6.1. The Outliner

In the pull-down box at the top of the outline window you can choose between several different lists including other TOC-like objects such as lists of tables and figures, footnotes, labels and cross-references (see section 6.1), notes, or citations (see section 6.6). Clicking on any of these will take you to the corresponding object in your document.

In many cases right clicking on elements in the Outline opens a context menu that will allow for direct modification of those elements. For example with citations, the context menu allows you to open the citation dialog and to modify the citation.

The Filter field at the top allows you to filter which entries appear in the outline. For example, if you are displaying the list of *Labels and References* and wish to see only references to subsections, you can enter the text "sub" in the filter and only entries containing that text will be displayed.

At the bottom of the outline are several buttons that allow you to further control the display. The Sort option sorts the current list alphabetically. Otherwise the elements appear in the order in which they occur in the document. The Keep option keeps it in the current view state. Keeping means that when you have the subsections of sections 2 and 4 displayed and click on section 3, the subsections of sections 2 and 4 will still be displayed. Without the Keep option they will be hidden to highlight the clicked section 3. Finally, the slider at the left can be used to open the Outline to a given "depth". It is best just to experiment with it to see how it works.

The ⟳ button refreshes the TOC (useful while editing if you have changed sections in the document). Next to it are buttons that allow you to change the position of sections in your document. The ⮟ and ⮝ buttons move sections up and down in the document. For example, you can move section 2.5 before section 2.4 or after section 2.6. L$_Y$X will then automatically renumber the sections to the new order. With the buttons ⇤ and ⇥ (or the corresponding key bindings Tab and Shift-Tab) you can change the level of sections. You can make section 2.5 chapter 3 or subsection 2.4.1.

By right-clicking on a section in the outliner you can select the whole section to copy, cut or delete it.

2.6.2. Horizontal Scrolling

L$_Y$X does not have a horizontal scrollbar because standard output page formats such as ISO A4 are not as wide as PC or laptop screens. Therefore you will have trouble with the output of your document if document parts exceed the width of the L$_Y$X main screen.

There are of course exceptions where horizontal scrolling is necessary. For example

- L$_Y$X is used on a small tablet computer
- Wide tables that are rotated 90° to fit a whole page[3]
- Math constructs with long command names

For these cases L$_Y$X has an mechanism that scrolls automatically when the cursor is moved. As an example shrink the L$_Y$X window so that table 2.1 is wider. You will

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[3]See section *Rotated Floats* of the *Embedded Objects* manual.

now see a dotted red line on the right and/or left side of the table. Put the cursor into the table and move it with the Tab or the arrow keys to see the horizontal scrolling of the table.

Table 2.1.: Horizontal scrolling test.

a	b	c

2.7. Input/Word Completion

LyX provides completion of words by scanning all documents that are currently opened. Every word that appears in these documents is added to a database that is used to propose completions.

Input completion can be activated in the LyX preferences (menu Tools ▷ Preferences) in the section Editing ▷ Input Completion. With the option Automatic inline completion the proposed completion is shown directly after the cursor. With the option Automatic popup the completions are always shown in a popup. The cursor completion indicator can be turned off by deselecting the option Cursor indicator. With the general options you can define the delay time for the inline and popup completion, you can set the minimal number of characters a word must have that it will be taken into account for a completion and you can choose if long completions should be abbreviated.

LyX displays a small triangle after the cursor as an indicator that there are completions available. Press the Tab key to accept a proposed completion. If several completions are possible, a popup is opened showing them. You can select a completion in the popup using the mouse or the arrow keys and accept the chosen completion by pressing Return.

The completion options for math in the preferences do the same as the corresponding options for text. Additionally, the special math option Autocorrection enables characters to be composed. For example, if you want to insert the character $\Rightarrow$, you can input the characters "=>" in a formula to create it. This is a quick alternative to the insertion of commands or the use of the math toolbar. A list of supported character combinations can be found in the file `autocorrect` located in LyX's installation folder. Note that using Undo after autocorrection has done its magic leaves the un-corrected sequence. In the example above, Undo leads to "=>", and a second Undo yields "=".

2.8. Basic Key Bindings

There are at least two different primary binding maps: `cua` and `emacs`. L_YX's default is `cua`, which can be changed in the L_YX preferences under Editing ▷ Shortcuts. (You can list or change any key bindings as explained in section C.2.2.1.)

Some keys, like Page Up, Page Down, Left, Right, Up and Down, do exactly what you expect them to do. Other keys don't:

Tab   There is no such thing as a tab stop in L_YX. If you do not understand this, go read sections 3.2.1 and 3.3, especially section 3.3.6, right now. Yes, right now. If you are still confused, look in the *Tutorial.*
In L_YX the Tab key is only used to accept proposed input completions, to move the cursor in tables or math matrices or to change the nesting level in Itemize or Enumerate.

Esc   This is the "cancel key." It is used, generically, to cancel operations. Other parts of the manual will go into greater detail about this.

Home/End These move the cursor, respectively, to the beginning and end of a line, unless you are using the Emacs bindings where they jump to the beginning or end of the file.

There are three modifier keys:

Control   (Denoted by "Ctrl" in the documentation files) This has a couple of different uses depending on which keys it is used in combination with:

- Backspace or Delete, it deletes an entire word instead of a single character.

- Left and Right, it moves by words instead of characters.

- Home and End, it moves to the beginning and the end of the document, respectively.

Shift   (Denoted by "Shift" in the documentation files) Use this with any of the arrow keys to select the text between the old and new cursor positions.

Alt   (Denoted by "Alt" in the documentation files) This is the Alt key on many keyboards, unless your keyboard has a distinct Meta key. If you have both keys, you will need to try out which one actually performs the Alt+ function.
This key does many different things, but it also activates the *menu accelerator keys.* If you use this in combination with any of the underlined letters in a menu or menu item, it selects that menu item.

For example, the sequence "Alt e s c" brings up the "Text Style" dialog. Typing "Alt f" opens the File menu.

The *Shortcuts* manual lists all other things bound to the Alt key.

You will learn more key bindings and short-cut keys as you use LyX because most actions will prompt a small message in the status bar at the bottom of LyX's main window describing the name of the action you have just triggered and any existing key bindings for that action. LyX menus also list the defined key bindings. The notation for the key bindings is very similar to the notation used in this documentation so you should not have any problems understanding it. However notice that Shift-modifiers are explicitly mentioned, so "Alt+P Shift+A" means Alt+P followed by a capital A.

3. LᵧX Basics

3.1. Document Types

3.1.1. Introduction

Before you do anything else, before you ever start writing a document, you need to decide what type of document you want to edit. Different types of documents use different types of spacing, headings, numbering schemes, and so on. Additionally, different documents use different paragraph environments, and format the title of your document differently.

A *document class* describes a group of properties common to a particular set of documents. By setting the document class, you automatically select these properties, making it easier to create the type of document you want. If you don't choose a document class, LᵧX picks one for you by default. So it is up to you to change the class of your document.

3.1.2. Document Classes

You can select a class using the Document ▷ Settings ▷ Document Class dialog. Select the class you want to use, and make any fine tunings of the options you may need.

3.1.2.1. Overview

There are four standard document classes in LᵧX. They are:

Article for basic articles

Report for basic reports

Book for writing a book

Letter for US-style letters

There are also some non-standard classes, which LᵧX only uses if you have installed the corresponding LᴬTEX class files, though most LᴬTEX distributions will include many of these. Here are some of the classes. The full list with detailed explanations can be found in chapter *Special Document Classes* in the *Additional Features* manual:

A&A Journal articles in the style and format used in Astronomy & Astrophysics

AMS Layouts for articles and books in the style and format used by the American Mathematical Society (AMS). There are three article layouts available. The standard one uses a typical numbering scheme for theorems etc., that prepends the section number to the number of the result. All result-type statements (propositions, corollaries, and so on) are sequenced together, but definitions, examples, and the like have their own sequence. The "sequential numbering" scheme does not place the section number with each result, but numbers them throughout the article in a single sequence. Each type of result gets its own sequence. There is also a layout that dispenses with numbering of statements altogether.

Beamer Layout for presentations

Broadway Layout for writing plays. It is not an existing LaTeX document class, but a new one that is distributed with L_YX.

Chess Layout to write about chess games

Curriculum vitae classes to create curriculum vitae

Elsevier Layout for journals of the Elsevier publishing group

Foils Used to make transparencies

Hollywood Used to type spec scripts for the US film industry. It is not an existing LaTeX document class, but a new one that is distributed with L_YX.

Kluwer Layout for journals of the Kluwer publishing group

KOMA-Script a replacement for the standard classes, offers many useful features like caption formatting, automatic print space calculation etc. (Is used by this document.)

Memoir another replacement for the standard classes

Powerdot Layout for presentations

REVTeX is used to write articles for the publications of the American Physical Society (APS), American Institute of Physics (AIP), and Optical Society of America (OSA). This class is not completely compatible with all L_YX features.

Slides Used to make transparencies

Springer Layouts for journals of the Springer publishing group

We will not go into detail about how to use these different document classes here. You can find details about the non-standard classes in chapter *Document Classes* of the *Additional Features* manual. Here, we will settle for a list of some of the common properties of all of the document classes.

3.1.2.2. Availability

You will probably find that many of the document classes listed under Document ▷ Settings ▷ Document Class are marked as "Unavailable". If you open a document that uses such a class, you will receive a warning saying that there are files that are required to produce output that are not installed. So it may seem that something is wrong.

Nothing is wrong. LyX includes many more document classes than you will ever need to use, and some of them are highly specialized. LyX tries to support as many different types of documents as possible, and it includes almost one hundred different layout files, with a growing number. No LaTeX distribution will install by default all files that might be needed by some document class. There are just too many of them. That is why some of the document classes are unavailable.

If there is a document class you would like to use that is marked as "Unavailable", you just need to install the appropriate package files. The easiest way to find out which files you need to install is to use that document class for a new file. LyX will display a dialog that will list the missing files. See section *Installing new LaTeX files* in of the *Customization* manual for information on how to install them.

Although LyX provides support for many different sorts of documents, it does not include support for every document class people might want to use. For example, many universities provide LaTeX class files to be used for dissertations submitted to those universities. The LyX team cannot write layout files to support every one of these. There are too many. Fortunately, users can write their own layout files, and many users have done so. Chapter *Installing New Document Classes* of the *Customization* manual contains information on how to create layout files.

3.1.2.3. Modules

Modules load additional features that are not by default available in the chosen document class. For example you might want to write Braille (embossed printing) in a document. This is not available in any document class, so you have to load the corresponding module in the Modules section of the Document ▷ Settings dialog. Highlighting a module in the dialog will bring up a description of what it does.

Some modules require LaTeX packages or file format converters that are not always installed by default. LyX will warn you if you do not have a required package or converter, and it will tell you what exactly you are missing. You can still use the module while editing your file, but you will not be able to export to PDF or print your document, since LyX will not be able to compile the LaTeX file without the missing prerequisites. If you want to be able to produce this kind of output, then you need to install the missing prerequisites and then reconfigure LyX by selecting Tools ▷ Reconfigure. See section *Installing new LaTeX files* of the *Customization* manual for more information on installing required packages.

Note: Some modules require other modules, and some pairs of modules are incompatible. L_YX will advise you about these things.

3.1.2.4. Local Layout

Modules are to L_YX much as packages are to L^AT_EX: They are intended to be used in a variety of different documents. If you often find yourself needing the same sort of thing in different documents, you should consider writing a module for this purpose. Sometimes, however, a particular document has very special needs, but you need a specific inset or text style only that one time. You want something that is like a document's own L^AT_EX preamble. What you want is L_YX's "Local Layout". See section *Local Layout* of the *Customization* manual for information on how to use it.

3.1.2.5. Properties

Each class has a default set of options. Here's a quick table describing them:

	Page style	Sides	Columns	Max. sectioning level
article	Plain	One	One	Section
report	Plain	One	One	Chapter
book	Headings	Two	One	Chapter
letter	Plain	One	One	none

You're probably also wondering what "Max. sectioning level" means. There are several paragraph environments used to create section headings. Different document classes allow different types of section headings. Only two use the **Chapter** heading; the rest do not and begin instead with the **Section** heading. Some document classes, such as the ones for letters, don't use any section headings. In addition to **Chapter** and **Section** headings, there are also **Subsection** headings, **Subsubsection** headings, and so on. We will describe these headings fully in section 3.3.4.

3.1.3. Document Layout

The most important properties of document classes are set in the menu **Document ▷ Settings**. There in the **Class options** field under **Documents Class**, you can enter special options for your document class in a comma-separated list. This is only necessary if L_YX doesn't support special options you want to use for your document. To learn more about your favorite L^AT_EX-class and its options, you have to read its manual.

The drop box **Page style** in the **Document ▷ Settings** dialog under **Page Layout** controls what sorts of headings and page numbers go on a page. You can choose between the following five options:

Default   Use default page style of current class.

empty   No page numbers or headings.

plain   Page numbers only.

headings   Page numbers and either the current chapter or section title and number. Whether LyX uses the current chapter or the current section depends on the maximum sectioning level of the class.

fancy   This allows you to define fully customizable headers and footers if you have the LaTeX-package **fancyhdr** installed. How they are defined is explained in section 6.12.

The separation of paragraphs is described in section 3.2.2.

3.1.4. Paper Size and Orientation

You can find the following options in the menu Page Layout of the Document ▷ Settings dialog:

Paper Format What size paper to print on. The choices are

- Default
- A0 – A6
- B0 – B6
- C0 – C6
- US letter, US legal, US executive
- JIS B0 – JIS B6
- Custom

Orientation To choose whether to output as Landscape or as Portrait.

Two-sided document Adjusts the print space to print both sides of paper. That means that the print space for odd- and even-numbered pages is different.

3.1.5. Margins

Paper margins are set in the menu Document ▷ Settings.

If you use a KOMA-Script document class, you can use the default settings because KOMA-Script calculates the print space automatically by taking the paper format and the font size into account.

3.1.6. Important Note

If you change a document class, L_YX has to convert everything into the new class. That includes the paragraph environments. Some paragraph environments are standard, in so far as all of the document classes have them; but some classes have special paragraph environments. If this is the case, and you change the document class, L_YX will mark the paragraphs whose styles it no longer understands as "unknown". The name of the style is retained, in case you should want to go back to the old class. But these paragraphs will be output with no special formatting, so you will either need to create a new style yourself or else convert these paragraphs manually to a style present in your new document class.

3.2. Paragraph Indentation and Separation

3.2.1. Introduction

Before describing all of the various paragraph environments, we'd like to say a word or two about paragraph indentation.

Everyone seems to have their own convention for separating paragraphs. Most Americans indent the first line of a paragraph. Others don't indent but put extra space between the paragraphs. If you choose indentation for paragraphs the *first* paragraph of a section, or after a figure, an equation, a table, a list, etc., is *not* indented. Only a paragraph following another paragraph gets indented. Note that the indentation behavior is different when you use another document language than English. LATEX takes care that the indentation follows the rules of the language used.

The space between paragraphs, like the line spacing, the space between headings and text — in fact, all the spacing for just about everything —is pre-coded into L_YX. As we said, you don't worry about how much space to add between what. L_YX takes care of that. In fact, these pre-coded vertical spacings aren't a single number but a range. That way, L_YX can squish or stretch the space between lines to make sure figures fit on a page with text, so that sections don't start at the bottom of a page, and so on.[1] However, pre-coded doesn't mean you can't change them. L_YX gives you the ability globally to change *all* these pre-coded spacings. We will explain more later.

3.2.2. Paragraph Separation

Select Indentation or Vertical space in the submenu Text Layout of the dialog Document ▷ Settings to indent paragraphs or to add extra space between paragraphs, respectively.

---

[1] LATEX does this when L_YX goes to produce a printable file.

3.2.3. Fine-Tuning

You can also change the separation method of a single paragraph. Open the Edit ▷ Paragraph Settings dialog and toggle the Indent Paragraph option to change the state of the current paragraph (shortcut Alt+A I). If paragraphs have no indentation but use extra space for separation, this button will be ignored (you can't indent a single paragraph by toggling this).

You should only need to change the indentation method for a single paragraph if you need to do some fine-tuning.

3.2.4. Line Spacing

In the Document ▷ Settings dialog you can set the line spacing for the whole document in the submenu Text Layout.[2] You can set it for a single paragraph in the Edit ▷ Paragraph Settings dialog but this should be used very exceptionally because vertical spacing is normally defined in the environment's style.

3.3. Paragraph Environments
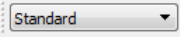
3.3.1. Overview

Paragraph environments correspond to the

\begin{*environment*} ... \end{*environment*}
command sequence in LaTeX files. If you don't know LaTeX, or the concept of a paragraph environment is totally alien to you, we urge you to read the *Tutorial*. The *Tutorial* also contains many more examples than this section does.

A paragraph environment is simply a "container" for a paragraph which gives that paragraph certain properties. This can include a particular style of font, different margins, a numbering scheme, labels, and so on. Additionally, you can "nest" the different environments inside one another, allowing one environment to inherit some of the properties of another. The different paragraph environments totally replace the need for messy tab stops, on the fly margin adjustment, and other hangovers from the days of typewriters. There are several paragraph environments that are specific to a particular document type. We will only be covering the most common ones here.

To choose a new paragraph environment, use the pull-down box ⌷ Standard ▼ at the left end of the toolbar. LyX will change the environment of the *entire* paragraph in which the cursor sits. You can also change the environment of an entire group of paragraphs if you select them before choosing the new environment.

---

[2]You need to have the LaTeX-package **setspace** installed to use this feature.

Note that entering Return will *typically* create a new paragraph using the Standard paragraph environment. We say "typically" because if you are in one of these environments:

- Quote

- Quotation

- Verse

- Itemize

- Enumerate

- Description

- List

LYX keeps the old paragraph environment when you enter Return, rather than resetting it to Standard. Also the nesting depth is preserved (for more on nesting see section 3.4).

3.3.2. Standard

The default paragraph environment is Standard for most classes. It creates a plain paragraph. If LYX resets the paragraph environment, this is the one it chooses. In fact, the paragraph you're reading right now (and most of the ones in this manual) are in the Standard environment.

You can nest a paragraph using the Standard environment in just about anything else, but you can't really nest anything in a Standard environment.

3.3.3. Document Title

A LaTeX title page has three parts: the title itself, the name(s) of the author(s) and a "footnote" for thanks or contact information. For certain types of documents, LaTeX places all of this on a separate page along with today's date. For other types of documents, the title "page" goes at the top of the first page of the document.

LYX provides an interface to the title page commands through the paragraph environments Title, Author, and Date. Here's how you use them:

- Put the title of your document in the Title environment.

- Put the author name in the Author environment.

- If you want the date to have a certain appearance, want to use a fixed date, or want other text to appear in place of today's date, put that text in the Date environment. Note that using this environment is optional. If you don't provide

any, LaTeX will automatically insert today's date. If you don't want a date, use the option Suppress default date on front page in the menu Document ▷ Settings ▷ Document class.

You can use footnotes to insert "thanks" or contact information.

3.3.4. Headings

There are several paragraph environments for producing section headings. LyX takes care of the numbering for you.

3.3.4.1. Numbered Headings

There are 7 numbered types of section headings. They are:

1. Part

2. Chapter

3. Section

4. Subsection

5. Subsubsection

6. Paragraph

7. Subparagraph

LyX labels each heading with a series of numbers, separated by periods. The numbers describe where in the document you are. Unlike the other headings, parts are numbered with Roman numerals.

Headings all subdivide your document into different pieces of text. For example, suppose you're writing a book. You group the book into chapters. LyX does a similar grouping:

- Part is divided into either Chapters or Sections

- Chapters are divided into Sections

- Sections are divided into Subsections

- Subsections are divided into Subsubsections

- Subsubsections are divided into Paragraphs

- Paragraphs are divided into Subparagraphs

Note: Not all document types use the Chapter heading as the maximum sectioning level. In that case the Section is the top-level heading.

So, if you use the Subsubsection environment to label a new sub-subsection, L_YX labels it with its number, along with the number of the subsection, section and, if applicable, chapter that it's in. For example: the fifth section of the second chapter of this book has the label "2.5".

3.3.4.2. Unnumbered Headings

The unnumbered section headings have a "*" at the end of their name. They work the same as their numbered counterparts but will not appear in the table of contents, see section 6.2.

3.3.4.3. Changing the Numbering

You can also alter which sectioning levels get numbered and which ones appear in the Table of Contents. Now, this doesn't remove any of the levels; that's preset in the document class. Just as certain classes start with Chapter and go down to the Subparagraph level. Others start at Section. Similarly, not all document classes number all sectioning levels. Most don't number Paragraph or Subparagraph. This is something you can change.

Open the Document ▷ Settings dialog. Under Numbering & TOC you will see two counters. The one named Numbering controls how far down in the sectioning hierarchy L_YX numbers a section heading. The other one controls the appearance of the section headings in the table of contents.

3.3.4.4. Short Titles of Headings

Some section or chapter titles, such as this one, can get quite long. This can cause trouble when there is limited horizontal space. For example, if the header of the page is set to show the current section title, a long title will protrude over the page margins and look awful.

L^AT_EX allows you to specify a short title for section headings. This short title is used in the header and in the actual table of contents, avoiding the problem mentioned. To specify a short title, set the cursor behind the title and use the menu Insert ▷ Short Title. This will insert a box labeled "Short Title" which you can use to enter the short title text. This also works for captions inside floats. There can only be one short title per title.

The title of this section is a good example of using this feature.

3.3.4.5. Special Information

The following information applies to all section headings:

- You cannot do any nesting with these environments.

- You cannot use a margin note in any of these environments.

- You can only use inline math in these environments.

- You can use labels and cross-references to refer to their numbers.

3.3.5. Quotes and Poetry

L_YX has three paragraph environments for writing poetry and quotations. They are Quote, Quotation, and Verse. Forget the days of changing line spacing and twiddling with margins. These three paragraph environments already have those changes built-in. They all widen the left margin and add a bit of extra space above and below the text they contain. They also allow nesting, so you can put a Verse in a Quotation, as well as in some other paragraph environments.

There is another feature of these three paragraph environments: they do *not* reset to Standard when you start a new paragraph. So, you can type in that poem and merrily enter Return without worrying about the paragraph environment changing on you. Of course, that means that, once you are done typing in that poem, you have to change back to the Standard environment yourself.

3.3.5.1. Quote and Quotation

Now that we've described the similarities of these three environments, it's time for the differences. Quote and Quotation are identical except for one difference: Quote uses extra spacing to separate paragraphs and never indents the first line. Quotation *always* indents the first line of a paragraph and uses the same line spacing throughout.

Here's an example of the Quote environment:

> This is in the Quote environment. I can keep writing, extending this line out further and further until it wraps. See – no indentation!

> Here's the second paragraph of this quote. Again, there's no indentation, but there is extra space between me and the other paragraph.

Here's another example, this time in the Quotation environment:

> This is in the Quotation environment. If I keep writing, you will see the indentation. If your country uses a writing style that indicates new paragraphs by indenting the first line, then Quotation is the environment for you! Well, you'd use it *if* you were quoting other text.
> Here's a new paragraph. I could ramble on and on, like a politician at election time. If I did that, though, you'd get bored.

As the examples show, **Quote** is for those people who use extra space to separate paragraphs. They should put quotes in the **Quote** environment. Those who use indentation to mark a new paragraph should use the **Quotation** paragraph environment for quoted text.

3.3.5.2. Verse

Verse is a paragraph environment for poetry, rhymes, verses, and so on. Here's an example:

> This is in Verse
> Which I did not rehearse!

> It could be much worse. This line could be long, very long, oh so long, so very long that it wraps around. It looks okay on screen, but in the printed version, the extra lines are indented a bit more than the first. Okay, so it's turned to prose and doesn't rhyme anymore. So sue me.

> To break a line
> And make things look fine
> Use **Ctrl+Retour**.

As you can see, **Verse** does not indent both margins. Each stanza of the verse or poem is in its own paragraph. To separate the individual lines of a stanza, use the shortcut **Ctrl+Retour**.

3.3.6. Lists

L_YX has four different paragraph environments for creating different kinds of lists. In the **Itemize** and **Enumerate** environments, L_YX labels your list items with bullets or numbers, respectively. In the **Description** and **List** environments, L_YX lets you provide your own label. We will present the individual details of each type of list next after describing some general features of all four of them.

3.3.6.1. General Features

The four paragraph environments for lists differ from the other environments in several ways. First, L_YX treats each paragraph as a list item. Hitting **Return** does *not* reset the environment to **Standard** but keeps the current environment and creates a new list item. The nesting depth is thereby kept. If you want to keep the paragraph environment but reset the current nesting depth, you can use **Alt+Retour**. If you do this at the top level of a list, it returns you to the **Standard** environment.

You can nest lists of any type inside one another. In fact, L_YX changes the labels on some list items depending on how it is nested. If you intend to use any of the list

paragraph environments, we suggest you read all of section 3.4.

3.3.6.2. Itemize

The first type of list we will describe in detail is the Itemize paragraph environment. It has the following properties:

- Each item has a particular bullet or symbol as its label.
  - LYX uses the same symbol for all of the items in a given nesting level.
  - The symbol appears at the beginning of the first line.
- The items can have any length. LYX automatically offsets the left margin of each item. The offset is always relative to whatever environment the Itemize list may be in.
- If you nest an Itemize environment inside another Itemize environment, the label changes to a new symbol.
  - There are four different symbols for up to a four-fold nesting.
  - LYX always shows the same symbol on screen.
  - See section 3.4 for a full explanation of nesting.

Of course, that explanation was also an example of an Itemize list. The Itemize environment is best suited for lists where the order doesn't matter.

We said that different levels use different symbols as their label. Here's an example of all four possible symbols.

- The label for the first level Itemize is a large black dot, or bullet.
  - The label for the second level is a dash.
    * The label for the third is an asterisk.
      · The label for the fourth is a centered dot.
    * Back out to the third level.
  - Back to the second level.
- Back to the outermost level.

These are the default labels for an Itemize list. You can customize how these labels are displayed in the output in the Document ▷ Settings dialog in the submenu Bullets. These customizations are not displayed in LYX.

Notice how the space between items decreases with increasing depth. We will explain nesting and all the tricks you can do with different depths in section 3.4.

3.3.6.3. Enumerate

The Enumerate environment is used to create numbered lists and outlines. It has these properties:

1. Each item has a numeral as its label.

    a) The label type depends on the nesting depth.

2. L_YX automatically counts the items for you and updates the label as appropriate.

3. Each new Enumerate environment resets the counter to one.

4. Like the Itemize environment, the Enumerate environment:

    a) Offsets the items relative to the left margin. Items can have any length.

    b) Reduces the space between items as the nesting depth increases.

    c) Uses different types of labels depending on the nesting depth.

    d) Allows up to a four-fold nesting.

Unlike the Itemize environment, Enumerate shows the different labels for each item in L_YX. Here is how L_YX labels the four different levels in an Enumerate:

1. The first level of an Enumerate uses Arabic numerals followed by a period.

    a) The second level uses lower case letters surrounded by parentheses.

        i. The third level uses lower-case Roman numerals followed by a period.

            A. The fourth level uses capital letters followed by a period.

            B. Again, notice the decrease in the spacing between items as the nesting depth increases.

        ii. Back to the third level

    b) Back to the second level.

2. Back to the outermost level.

You can customize the type of numbering used in the Enumerate environment, see section 3.3.7. Such customization only shows up in the printed version, not in L_YX.

There is more to nesting Enumerate environments than we've stated here. You should read section 3.4 to learn more about nesting.

3.3.6.4. Description

Unlike the previous two environments, the Description list has no fixed label. Instead, L_YX uses the first "word" of the first line as the label. Here's an example:

Example: This is an example of the Description environment.

LyX typesets the label in boldface and puts extra space between it and the rest of the line.

With the first "word" it is meant that the first usage of the Space key ends the label if you are at the beginning of the first line of an item. If you need to use more than one word in a label use a Non-Breaking Space. (Use either Ctrl+Espace or the menu Insert ▷ Formatting ▷ Non-Breaking Space; see section 3.5.1 for more information.) Here is an example:

Second Example: This one shows how to use a Non-Breaking Space in the label of a Description list item.

Usage: You should use the Description environment for things like definitions and theorems. Use it when you need to make one word in particular stand out in the text that describes it. It's not a good idea to use a Description environment when you have an entire sentence that you want to describe. You're better off using Itemize or Enumerate and nesting several Standard paragraphs into them.

Nesting: You can nest Description environments inside one another, nest them in other types of lists, and so on.

Notice that after the first line, LyX indents subsequent lines, offsetting them from the first line.

3.3.6.5. Labeling

The Labeling environment is a LyX extension to LaTeX.

Like the Description list the Labeling list has user-defined labels for each list item but it provides some additional features. Here are its properties:

item labels LyX uses the first "word" of each line as the item label. The first Space after the beginning of the first line of an item marks the end of the label. If you need to use more than one word in an item label, use a non-breaking space as described above.

margins As you can see, LyX uses different margins for the item label and the body of the item text. The body of the text has a larger left margin, which is equal to the default label width plus a little extra space.

label width LyX uses the width of the label, or the default width, whatever is larger. If the label width is larger, the label "extends" into the first line. In other words, the text of the first line isn't aligned with the left margin of the rest of the item text.

default width You can set the default label width to ensure that the text of all items in a Labeling environment has the same left margin.

To change the default width, select all items in the list. Now open the Edit ▷ Paragraph Settings dialog (toolbar button 🔳). The text in the box Longest label determines the default label width. You can use the text of your largest label here, but you can also use the letter "M" multiple times instead. M is the widest character and is a standard unit of widths in LATEX. By using "M" as the unit of width you don't need to keep changing the contents of Longest label every time you alter a label in a List environment.

The predefined default width is the length of "00.00.0000" (equal to 6 M).

You should use the Labeling list the same way as the Description list: When you need one word to stand out from the text that describes it. The Labeling environment gives you another way to do this, using a different overall layout.

You can nest Labeling lists inside one another, nest them in other types of lists, and so on. They work just like the other list paragraph environments. Read section 3.4 to learn about nesting.

There is yet another feature of the Labeling list: As you can see in the examples, L_YX left-justifies the item labels by default. You can use additional Horizontal Fills to change how L_YX justifies the item label. Horizontal Fills are documented in section 3.5.2. Here are some examples:

Left   The default for Labeling item labels.

Right   One Horizontal Fill at the beginning of the label right justifies it.

Center   One Horizontal Fill at the beginning of the label and one at the end centers it.

3.3.7. Customized Lists

The features described in this section require that the module Customisable Lists (enumitem) is loaded in the document settings. The module uses the LATEX-package **enumitem**.

3.3.7.1. Custom Enumerate Lists

The default numbering of numbered lists can be changed by adding an optional argument (menu Insert ▷ Enumerate Options) to the first item of each level in the list. There you add the command

label=\roman{enumi}

in TEX Code (shortcut Ctrl+L).[3] *enumi* is hereby the first level counter of the enumeration. The command **\roman** outputs the counter as a small Roman numeral.

---

[3]For more about TEX Code, look at section 6.11.

For capital Roman numerals replace **\roman** with **\Roman** in the command above. For Arabic numerals use **\arabic**. To "number" items with capital or small Latin letters use **\Alph** or **\alph**, respectively.

Note: You can only number 26 items with Latin letters, because this numbering is limited to single letters.

To change the numbering for the list sublevels, replace the 'i' in the command by the small Roman numeral of the level (enumi, enumii, enumiii, enumiv).

Here is a list with custom numbering:

#A# Level 1

    A.1 Level 2

    A.2 Level 2

       1 Level 3

         i) Level 4

For this list these commands were used:

label=\#\Alph{enumi}\#
label=\Alph{enumi}.\arabic{enumii}
label=\bfseries{\arabic{enumiii}}
label=\emph{\roman{enumiv})}

where the command **\emph{}** makes the label emphasized and **\bfseries{}** makes it bold.

Note: When you change the label of a list level, it will be used for all following lists until you change the definition.

3.3.7.2. Resumed Enumeration

Enumerations can be resumed after intermediate paragraphs:

1. first

2. second

regular text

3. resumed

To resume an enumeration, use the style Enumerate-Resume.

Note: If there is no previous enumeration to resume, you will get a LaTeX error.

Perhaps you might want to resume the list with a different number from the next one. Or you want to start a new enumeration with a defined number. This is possible by

adding an optional argument to the first list item of a normal enumeration. There, insert the command

start=number

where *number* is the number with which you want to resume the list. An example:

1. first item

2. second item

Enumeration starting at a given value:

4. This enumeration starts at 4

3.3.7.3. List Spacing

In some cases you might want less or more vertical space between the items of a list. For example if the default space is too much in your opinion in this case:

- A bullet list

- with standard spacing

You can decrease the space by adding an optional argument to the first item of the list. Add there the command **nolistsep** to get no additional list space like in this example:

- A bullet list
- without additional
- vertical space

To add space you can use several other commands provided by the LATEX-package **enumitem**. For more information see its documentation, [17].

There are also many commands available to change the horizontal spacing and indentation. Here is an example where the indentation was changed to that of the paragraphs in the document and the label separation was set to 2 cm so that the number is in the page margin:

1.   An enumeration

2.   with negative indentation

3.3.7.4. Further Customization

You can also change the style of description lists. The command

font=definition

changes the description label font, the command

style=definition

sets the list style.

An example where the command

font=\itshape, style=nextline

is used:

Ionizing radiation:
> Ionizing radiation consists of particles or electromagnetic waves that are energetic enough to detach electrons from atoms or molecules, therefore ionizing them.

Reference counting:
> In computer science, reference counting is a technique of storing the number of references, pointers, or handles to a resource such as an object, block of memory, disk space or other resource.

There are many more commands and features provided by the LaTeX-package **enumitem**. For more information see its documentation [17].

3.3.8. Letters

3.3.8.1. Address and Right Address: An Overview

Although LyX has document classes for letters, we've also created two paragraph environments called Address and Right Address. To use the letter class, you need to use specific paragraph environments in a specific order, otherwise LaTeX gags on the document. In contrast, you can use the Address and Right Address paragraph environments anywhere with no problem. You can even nest them inside other environments, though you can't nest anything in them.

Of course, you're not limited to using Address and Right Address for letters only. Right Address, in particular, is useful for creating article titles like those used in some European academic papers.

3.3.8.2. Usage

The Address environment formats text in the style of an address, which is also used for the opening and signature in some countries. Similarly, the Right Address environment formats text in the style of a right-justified address, which is used for the sender's address and today's date in some countries. Here's an example of each:

> Right Address
> Who I am
> Where I am
> When is it? What is today?

That was **Right Address**. Notice that the lines all have the same left margin, which L_YX sets to fit the largest block of text on a single line. Here's an example of the **Address** environment:

Who are you
Where do I send this
Your post office and country

As you can see, both **Address** and **Right Address** add extra space between themselves and the next paragraph. If you enter **Return** in either of these environments, L_YX resets the nesting depth and sets the environment to **Standard**. This makes sense, since **Return** is the `paragraph-break` function, and the individual lines of an address are not paragraphs. Thus, you have to use `break-line` (**Ctrl+Retour** or **Insert** ▷ **Formatting** ▷ **Ragged Line Break**) to start a new line in an **Address** or **Right Address** environment.

3.3.9. Academic Writing

Most academic writing begins with an abstract and ends with a bibliography or list of references. L_YX contains paragraph environments for both of these.

3.3.9.1. Abstract

The **Abstract** environment is used for the abstract of an article. Technically, you could use this environment anywhere, but you really should only use it at the beginning of the document, after the title. Also, don't bother trying to nest **Abstract** in anything else or vice versa. It will not work. The **Abstract** environment is only useful in the article and report document classes. The book document classes ignores the **Abstract** completely, and it's utterly silly to use **Abstract** in a letter document class.

The **Abstract** environment does several things for you. First, it puts the centered label "Abstract" above the text. The label and the text of the abstract are separated by some extra vertical space. Second, it typesets everything in a smaller font, just as you'd expect. Lastly, it adds a bit of extra vertical space between the abstract and the subsequent text. Well, that's how it will appear on the L_YX screen. The actual appearance in the output depends on the document class you are using.

Abstract

This is an abstract. As you can see, it is printed in a smaller font size than the other paragraph types.

Also several paragraphs are possible in the abstract.

This is a "Standard" paragraph to visualize the differences in the font size.

Figure 3.1.: Paragraph in the Abstract environment

Starting a new paragraph by entering Return does not reset the paragraph environment. The new paragraph will still be in the Abstract environment. So, you will have to change the paragraph environment yourself when you finish entering the abstract of your document.

We would love to demonstrate the Abstract environment, but since this document is in the "book" class, we can't do this. We inserted it therefore as figure 3.1. If you have never heard of an "abstract" before, you can safely ignore this environment.

3.3.9.2. Bibliography

The Bibliography environment is used to list references. Technically, you could use this environment anywhere, but you really should only use it at the end of the document. Nesting Bibliography in anything else or *vice versa* will not work.

When you first open a Bibliography environment, LyX adds a large vertical space, followed by the heading "Bibliography" or "References," depending on the document class. The heading is in a large boldface font. Each paragraph of the Bibliography environment is a bibliography entry. Thus, entering Return does not reset the paragraph environment. Each new paragraph is still in the Bibliography environment.

There is another, usually better way to include references in your document by using a BibTeX database. For more information on that, and for a detailed description of LyX's bibliography handling, have a look at section 6.6.

3.3.10. Special Environments

LyX provides two environments that can be used to emulate the behavior of a computer console/terminal and a typewriter.

3.3.10.1. LYX-Code

The LYX-Code environment is a LYX extension. It type-sets text in a typewriter-style font. It also treats the Space key as a fixed whitespace.[4] LYX-Code, Verbatim and Verbatim* are the only environments in which you can type multiple whitespaces in LYX. If you need to insert blank lines, you will still need to use Ctrl+Retour (the `break-line` function). Return breaks paragraphs. Note, however, that Return does not reset the paragraph environment. So, when you finish using the LYX-Code environment, you will need to change the paragraph environment yourself. Also, you can nest the LYX-Code environment inside of others.

There are a few quirks with this environment:

- You cannot use Ctrl+Retour at the beginning of a new paragraph (i. e. you can't follow Return with a Ctrl+Retour).

- You cannot follow a Ctrl+Retour with a Space but with a Ctrl+Espace.

- You cannot have an empty paragraph or an empty line. You must put at least one Space in any line you want blank. Otherwise, LaTeX generates errors.

- You cannot get the typewriter double quotes by typing " since that will insert *real* quotes. You get the typewriter double quotes with undefined.

Here is an example:

```
#include <stdio.h>

int main(void)
{
    printf("Hello World!\n");
    return 0;
}
```

This is just the standard "Hello world!" program.

LYX-Code has one purpose: to typeset code, such as program source, shell scripts and so on. Use it only in those very special cases where you need to generate text as if you used a typewriter. For longer parts of programming code, use the listings inset that is described in the chapter *Program Code Listings* of the *Embedded Objects* manual.

3.3.10.2. Verbatim

The Verbatim environment is similar to the LYX-Code environment with the difference that its content will be treated like a computer console text. Verbatim does therefore not have paragraphs so that Return breaks lines. Compared to LYX-Code the Space

---

[4]In the LYX-Code environment, the Space key is treated as a Non-Breaking Space instead of an end-of-word marker.

key is treated like a normal space in text (not as a non-breaking space) and you can have empty lines. In contrary to LyX-Code, Verbatim cannot

- have a certain language and a text style

- contain hyperlinks, boxes, foot- and margin notes, notes, math, citations, index- and nomenclature entries, labels, tables, graphics, listings, floats and TeX Code

Because of these properties Verbatim works like a typewriter. Here is an example:

```
This is Verbatim.
The following 2 lines are empty:


Almost everything is allowed in Verbatim:"%&$§#~'`\}][{|
```

The Verbatim* environment is identical to Verbatim with the difference that spaces appear in the output as the character '␣'. An example:

```
This␣is␣Verbatim*.
```

3.4. Nesting Environments

3.4.1. Introduction

LyX treats text as a unified block with a particular context and specific properties. This allows you to create blocks that inherit some of the properties of another block. For example you have three main points in an outline, but point #2 also has two subpoints. In other words, you have a list inside of another list, with the inner list "attached" to item #2:

1. one

2. two

    a) sublist – item #1

    b) sublist – item #2

3. three

You put a list inside a list by nesting one list inside the other. Nesting an environment is quite simple: Select Edit ▷ Increase List Depth or Decrease List Depth to change the nesting depth (the status bar will tell you how far you are nested). Instead of the menu, you can also use the toolbar buttons and or the key bindings Tab and Shift+Tab or Alt+Maj+Droite and Alt+Maj+Gauche. The change will work on the current selection, if you have made one (allowing you to change the nesting of several paragraphs at once), or the current paragraph.

Note that LYX only changes the nesting depth if it can. If it is invalid to do so, nothing happens if you try to change the depth. Additionally, if you change the depth of one paragraph, it affects the depth of every paragraph nested inside of it.

Nesting isn't limited to lists. In LYX, you can nest just about anything inside anything else, as you're about to find out. This is the real power of nesting paragraph environments.

3.4.2. What You Can and Can't Nest

Before we fire a list of paragraph environments at you, we need to tell you a little bit more about how nesting works.

The question of nesting a paragraph environment is a bit more complicated than a simple yes or no. There are three types of paragraph environments:

- Completely unnestable

- Fully nestable, you can nest them inside things and you can also nest other things inside them.

- A third type, you can nest them into other environments, but you can't nest anything into them.

Here's a list of the three types of nesting behavior, and which paragraph environments have them:

Unnestable Can't nest them. Can't nest into them.

- Bibliography

- Abstract

- Title

- Author

- Date

Fully Nestable You can nest them. You can nest other things into them.

- Verse

- Quote

- Quotation

- Itemize

- Enumerate

- Description

- List
- LyX-Code
- Verbatim
- Verbatim*

Nestable-Inside You can nest them inside other things. You can't nest anything into them.

- Standard
- Part
- Chapter
- Section
- Subsection
- Subsubsection
- Paragraph
- Subparagraph
- Part*
- Chapter*
- Section*
- Subsection*
- Subsubsection*
- Right Address
- Address

Note: Although it is possible, for example, to nest numbered section headings like Chapter, Section, etc. into lists, it is highly recommended not to do this because the aim is to create well-structured documents following typesetting guidelines whereas nested section headings violate this.

3.4.3. Nesting Other Things: Tables, Math, Floats, etc.

There are several things that aren't paragraph environments, but which are affected by nesting anyhow. They are:

- equations
- tables

- figures

(**Note:** Figures and tables in Floats are not affected by this. Have a look at section 4.6 for more information about Floats.)

LYX can treat these three objects as either a word or as a paragraph. If a figure, table, or an equation is inline, it goes wherever the paragraph it is in goes.

On the other hand, if you have an equation, figure or table in a "paragraph" of its own, it behaves just like a "nestable-inside" paragraph environment. You can nest it into any environment, but you obviously can't nest anything into it.

Here's an example with a table:

1. Item One

   a) This is (a) and it's nested.

a	b
c	d

   b) This is (b). The table is actually nested inside (a).

2. Back out again.

If we hadn't nested the table at all, the list would look like this:

1. Item One

   a) This is (a) and it's nested.

a	b
c	d

1. This is (b). The table is *not* nested inside (a). In fact, it's not nested at all.

2. Back out again.

Notice how item (b) is not only no longer nested, but is also the first item of a new list!

There's another trap you can fall into: Nesting the table, but not going deep enough. LYX then turns anything after the table into a new sublist.

1. Item One

   a) This is (a) and it's nested.

a	b
c	d

1. This is (b). The table is actually nested inside Item One, but *not* inside (a).

2. Back out again.

As you can see, item (b) turned into the first item of a new list, but a new list *inside* item 1. The same thing would have happened to a figure or an equation. So, if you nest tables, figures or equations, make sure you go to the right depth!

3.4.4. Usage and General Features

Speaking of levels, LyX can perform up to a six-fold nesting. In other words, "level #6" is the innermost possible depth. Here's an example to illustrate what we mean:

1. level #1 – outermost

    a) level #2

        i. level #3

            A. level #4

                • level #5

                    – level #6

There are two exceptions to the six-fold nesting limit, and you can see both of them in the example. Unlike the other fully-nestable environments, you can only perform a four-fold nesting with the **Enumerate** and **Itemize** environments. For example, if we tried to nest another **Enumerate** list inside item "A.", we would get errors.

3.4.5. Some Examples

The best way to explain just what you can do with nesting is by illustration. We have several examples of nested environments. In them, we explain how we created the example, so that you can reproduce them.

3.4.5.1. Example 1: The Six-fold Way and Mixed Nesting

#1-a This is the outermost level. It's a **List** environment.

   #2-a This is level #2. We created it by using **Alt+Retour** followed by **Alt+Maj+Droite**.

       #3-a This is level #3. This time, we just enter **Return**, then used **Alt+Maj+Droite** twice in a row. We could have also created it the same way as we did the previous level, by entering **Alt+Retour** followed by **Alt+Maj+Droite**.

           This is actually a **Standard** environment, nested inside of "#3-a". So, it's at level #4. We did this by entering **Alt+Retour**,

then Alt+Maj+Droite, then changing the paragraph environment to Standard. Do this to create list items with more than one paragraph — it also works for the Description, Enumerate, and Itemize environments!

Here's another Standard paragraph, also at level #4, made with just a Alt+Retour.

#4-a This is level #4. We enter Alt+Retour and changed the paragraph environment back to List. Remember — we can't nest anything inside a Standard environment, which is why we're still at level #4. However, we *can* keep nesting things inside "#3-a".

#5-a This is level #5...

#6-a ...and this is level #6. By now, you should know how we made these two.

#5-b Back to level #5. Just enter Alt+Retour followed by a Alt+Maj+Gauche.

#4-b After another Alt+Retour followed by a Alt+Maj+Gauche, we're back at level #4.

#3-b Back to level #3. By now it should be obvious how we did this.

#2-b Back to level #2.

#1-b And last, back to the outermost level, #1. After this sentence, we will enter Return and change the paragraph environment back to Standard to end the list.

We could have also used the Description, Quote, Quotation, or even the Verse environment in place of the List environment. The example would have worked exactly the same.

3.4.5.2. Example 2: Inheritance

```
This is the LyX-Code environment, at level #1, the outermost
level.  Now we will enter Return, then Alt+Maj+Droite, after
which, we will change to the Enumerate environment.
  1. This is the Enumerate environment, at level #2.
  2. Notice how the nested Enumerate not only inherits its
     margins from its parent environment (LyX-Code), but also
     inherits its font and spacing!
```

We ended this example by entering Return. After that, we needed to reset the paragraph environment to Standard and reset the nesting depth by using Alt+Maj+Gauche once.

3.4.5.3. Example 3: Labels, Levels, and the Enumerate and Itemize Environments

1. This is level #1, in an Enumerate paragraph environment. We're actually going to nest a bunch of these.

   a) This is level #2. We used Alt+Retour followed by Alt+Maj+Droite. Now, what happens if we nest an Itemize environment inside of this one? It will be at level #3, but what will its label be? An asterisk?

      - No! It's a bullet. This is the *first* Itemize environment, even though it's at level #3. So, its label is a bullet. (We got here by using Alt+Retour, then Alt+Maj+Droite, then changing the environment to Itemize.)

        – Here's level #4, produced using Alt+Retour, then Alt+Maj+Droite. We will do that again. . .

          i. . . . to get to level #5. This time, however, we also changed the paragraph environment back to Enumerate. Notice the type of numbering, it is *lowercase Roman*, because we are in the *thirdfold* Enumerate environment (that is, it is an Enumerate inside an Enumerate inside an Enumerate).

          ii. What happens if we *don't* change the paragraph environment, but decrease the nesting depth? What type of numbering does LyX use?

          iii. Oh, as if you couldn't guess by now, we're just using Alt+Retour to keep the current environment and depth but create a new item.

          iv. Let's use Alt+Maj+Gauche to decrease the depth after the next Alt+Retour.

         i. This is level #4. Look what type of label LyX is using!

      i. This is level #3. Even though we've changed levels, LyX is still using a lowercase Roman numeral as the label.Why?

      ii. Because, even though the nesting depth has changed, the paragraph is *still* a thirdfold Enumerate environment. Notice, however, that LyX *did* reset the counter for the label.

   b) Another Alt+Retour Alt+Maj+Gauche sequence, and we're back to level #2. This time, we not only changed the nesting depth, but we also moved back into the twofold-nested Enumerate environment.

2. The same thing happens if we do another Alt+Retour Alt+Maj+Gauche sequence and return to level #1, the outermost level.

Lastly, we reset the environment to Standard. As you can see, the level number doesn't correspond to what type of labeling LYX uses for the Enumerate and Itemize environments. The number of other Enumerate environments surrounding it determines what kind of label LYX uses for an Enumerate item. The same rule applies for the Itemize environment, as well.

3.4.5.4. Example 4: Going Bonkers

1. We're going to go totally nuts now. We will not nest as deep as in the other examples, nor will we go into the same detail with how we did it. (level #1: Enumerate)

   (Return, Alt+Maj+Droite, Standard: level #2) We will stick an encapsulated description of how we created the example in parentheses someplace. For example, the two key bindings are how we changed the depth. The environment name is the name of the current environment. Either before or after this, we will put in the level.

2. (Return, Enumerate: level #1) This is the next item in the list.

   > Now we will add verse.
   > It will get much worse.
   > (Return, Alt+Maj+Droite, Verse: level #2)
   >
   > Fiddle dee, Fiddle doo.
   > Bippitey boppitey boo!
   > (Alt+Retour)

   Here comes a table:

one-fish	two-fish
red-fish	blue-fish

   (Alt+Retour, Table, Alt+Maj+Droite 3 times, Alt+Retour, Verse, Alt+Maj+Gauche)

3. (Return, Enumerate: level #1) This is another item. Note that selecting a Table resets the nesting depth to level #1, so we increased the nesting depth 3 times to put the table inside the Verse environment.

   > We're now ending the Enumerate list and changing to Quotation. We're still at level #1. We want to show you some of the things you can do by mixing environments. The next set of paragraphs is a "quoted letter." We will nest both the Address and Right Address environments inside of this one, then use another nested Quotation for the letter body. We will use Alt+Retour to preserve the depth. Remember that you need to use

Ctrl+Retour to create multiple lines inside the Address and Right Address environments. Here it goes:

> 1234 Nowhere Rd.
> Moosegroin, MT 00100
> 9-6-96

Dear Mr. Fizlewitz:

> We regret to inform you that we cannot fill your order for 50 L of compressed methane gas due to circumstances beyond our control. Unfortunately, several of our cows have mysteriously exploded, creating a backlog in our orders for methane. We will place your name on the waiting list and try to fill your order as soon as possible. In the meantime, we thank you for your patience.
>
> We do, however, now have a special on beef. If you are interested, please return the enclosed pricing and order form with your order, along with payment.
>
> We thank you again for your patience.

Sincerely,
Bill Hick

> That ends that example!

As you can see, nesting environments in L$_Y$X gives you a lot of power with just a few keystrokes. We could have easily nested an Itemize list inside of a Quotation or Quote, or put a Quote inside of an Itemize list. You have a huge variety of options at your disposal.

3.4.6. Separate Nestings

It is sometimes necessary to have two consecutive environments of the same type. For example you need two different enumerations:

1. Hello

    a) this is an

        i. enumeration

        - itemize list

1. Hi

2. this is another

3. enumeration

To split an existing list into two lists, set the cursor at the end of a list item and use the menu Insert ▷ Separated <Name> Above or Insert ▷ Separated <Name> Below. This inserts a plain separator (red line in L_YX) and before or behind it the new list. Inside nested environments, it is also possible to split the outer environment.

By right-clicking on a separator one can change it into a paragraph separator (red arrow in LyX). The difference between both separator types is that the plain separator only splits the list and not the current paragraph.

In general, you get an environment separator when you press Retour in a Standard environment immediately after a non-Standard one.

3.5. Spacing, Pagination and Line Breaks

What is a space? While you might be used to pressing the space key anytime you want to separate two words in ordinary word processors, L_YX offers you more spaces: spaces of different widths and spaces which can or cannot be broken at the end of a line. The following sections will show you some examples where those spaces are useful.

3.5.1. Non-Breaking Space

The non-breaking space: It is used to tell L_YX (and LᴬTᴇX) not to automatically break the line at that point. This may be necessary to avoid unlucky line breaks, like in:

> Further documentation is given in section
> 6.6.

Obviously, it would be a good thing to put a non-breaking space between "section" and "6.6". A non-breaking space is set with Insert ▷ Formatting ▷ Non-Breaking Space (shortcut Ctrl+Espace).

3.5.2. Horizontal Space

All horizontal spaces can be inserted with the menu Insert ▷ Formatting ▷ Horizontal Space. The length units are listed in Appendix D.

3.5.2.1. Normal Space

With the introduction of typewriters, it became conventional in some countries to type two spaces after a period to mimic the wider spaces used by typesetters at

the ends of sentences. There is no need to do this as LyX automatically takes care about this. However, you do not want an end of sentence space after an abbreviation followed by a period; see section 3.9.4.1 for examples. To insert a normal space, select Insert ▷ Formatting ▷ Normal Space (shortcut Ctrl+Alt+Espace).

3.5.2.2. Non-Breaking Thin Space

A "non-breaking thin space" is a blank which has half the size of a normal space (and it is also "non-breaking"). The typographical conventions in a lot of languages propose the use of thin spaces in cases where normal spaces would be too wide, for instance, inside abbreviations:

> D. E. Knuth has developed our beloved typesetting program.

or between values and units. Compare for example this:
10 kg (thin space)
10 kg (normal space)

You can insert thin spaces with the menu Insert ▷ Formatting ▷ Non-Breaking Thin Space (shortcut Ctrl+Maj+Espace).

3.5.2.3. More Spaces

You can also insert the following space types:

Medium space A line with a → ← medium space between the arrows.

Thick space A line with a → ← thick space between the arrows.

Negative thin space A line with a →✕— negative thin space between the arrows.

Negative medium space A line with a →✕— negative medium space between the arrows.

Negative thick space A line with a →✕— negative thick space between the arrows.

Half Quad (0.5 em) A line with an → ← half quad (0.5 em) space between the arrows.

Quad (1 em) A line with a →   ← quad (1 em) space between the arrows.

Double Quad (2 em) A line with a →   ← double quad (2 em) space between the arrows.

Custom space A line with →   ← 2 cm space between the arrows.

Table 3.1 lists the different space sizes.

Table 3.1.: Width of the different horizontal spaces.

Space	Width
Normal	$1/3$ em
Non-breaking Normal	$1/3$ em
Thin	$1/6$ em $= 3$ mu
Medium	4 mu
Thick	5 mu
Negative thin	-3 mu
Negative medium	-4 mu
Negative thick	-5 mu
Half Quad ($1/2$ em)	$1/2$ em $= 1$ en
Quad (1 em)	1 em
Double Quad (2 em)	2 em

3.5.2.4. Horizontal Fills

Horizontal fills (HFills) are a special L_YX feature for adding extra space in a uniform fashion. An Horizontal Fill is actually a variable length space, whose length always equals the remaining space between the left and right margins. If there is more than one Horizontal Fill on a line, they divide the available space equally between themselves.

Here are a few examples of what you can do with them:

This is on the left side   This is on the right

Left   Middle   Right

Left   1/3 Left   Right

That was an example in the Quote environment. Here→   ←is one in a standard paragraph. It may or may not be apparent in the printed text, but it *is* sitting in-between the two arrows.

Horizontal Fills can be made visible when you choose one of the Fill Patterns in the space dialog: The following patterns are available:

Dots: . . . .

Rule: _____

Left arrow: ←——

Right arrow: ——→

Down brace (= opened downwards): ⏜

Up brace (= opened upwards):

Note: If an Horizontal Fill is at the beginning of a line, and *not* in the first line in a paragraph, L$_Y$X ignores it. This prevents Horizontal Fills from accidentally being wrapped onto a new line. If you need space in this case anyway, set the Non-Breaking option in the space dialog.

3.5.2.5. Phantom Space

Sometimes you want to insert space with exactly the length of a phrase. For example, you want to create the following multiple choice question:

What is correct English?:

Mr. Edge would have been jumps the gun.
        has to be jumped
        jumps

so that the choices appear exactly after the phrase "Mr. Edge ". To get this, you can use the phantom insets available via the menu Insert ▷ Formatting ▷ Phantom. In our case insert a horizontal phantom at the beginning of the last two lines and insert "Mr. Edge " into the phantom inset (note the space after "Edge"). A phantom insets prints only the space of its content (like a placeholder). That is why it is named "phantom". The normal phantom outputs the width and height of the content as space, while the horizontal and vertical variant only outputs the corresponding dimension.

3.5.3. Vertical Space

To add extra vertical space above or below a paragraph, use the Insert ▷ Formatting ▷ Vertical Space dialog. There you find the following sizes:

Small Skip, Medium Skip and Big Skip are L^AT_EX sizes which depend on the font size of the document. Default Skip is the skip adjusted in the dialog Document ▷ Settings ▷ Text Layout for the paragraph separation. If you use indentation to separate paragraphs Default Skip is equal to Medium Skip.

Half line height and Line height equal to the height, or half the height, of a line in the current font size including line spacing.

Vertical Fill is a variable space, set so that the space is maximal within one page. An example: you have only two short paragraphs on one page with a Vfill between them. Then the first paragraph is placed at the top of the page and the second one at the bottom, because the space between them is then maximal. Vertical Fills work like

Horizontal Fills: they fill the remaining vertical space on a page with blank space.[5]
If there are several Vertical Fills on a page, they divide the remaining vertical space
equally between themselves. You can therefore use Vertical Fills to center text on a
page, or even place text 2/3 down a page.

Custom are custom spaces in units explained in Appendix D.

Note: If the extra vertical space would be in the output at the top/bottom of a
page, the space is only added if you have also checked the option Protect.

3.5.4. Paragraph Alignment

You can change the paragraph alignment with the Edit ▷ Paragraph Settings dialog
(toolbar button 🔳). There are five possibilities:

- Justified (shortcut Alt+A J)
- Left (Alt+A L)
- Right (Alt+A R)
- Center (Alt+A C)
- Default (Alt+A E)

The default in most cases is justified alignment, in which the inter-word spacing
is variable and each line of a paragraph fills the region between the left and right
margins. The other three alignments should be self-explanatory, and look like this:

<div align="right">This paragraph is right aligned,</div>

<div align="center">this one is centered,</div>

this one is left aligned.

3.5.5. Forced Page Breaks

If you don't like the way LaTeX does the page breaks in your document, you can
force a page break where you want one. Normally this will not be necessary, because
LaTeX is good at page breaking. Only if you use a lot of Floats, LaTeX's page breaking
algorithm can fail.

We recommend you not to use forced page breaks until the text is finished and you
have checked in the preview to see if you *really* have to change the page breaking.

There are two types of page breaks: One that ends the page without any special
action. This can be inserted above or below a paragraph via the menu Insert ▷
Formatting ▷ New Page. The second type, that is inserted via the menu Insert ▷

---

[5]Horizontal Fills are described in section 3.5.2.

Formatting ▷ Page Break, ends a page but stretches the content of the page, so that it fills out the complete page. This type is useful to avoid whitespace when a page break produces a page on which only the last few lines are absent.

You might try to use a page break to ensure that a figure or table appears at the top of a page. This is, of course, the wrong way to do it. LyX gives you a way of automatically ensuring that your figures and tables appear at the top of a page (or the bottom, or on their own page) without having to worry about what precedes or follows your figure or table. See chapter 4 to learn more about Floats.

3.5.5.1. Clear Page Breaks

Rather than forced page breaks where the content behind the break is placed directly on the next page, you can also clear pages while breaking them. That means that the current paragraph is terminated and everything, including unprocessed floats, from the earlier part of the document are placed after it, if necessary by adding pages.

You can insert a clear page break with the menu Insert ▷ Formatting ▷ Clear Page. When you have a two-sided document like a book, you can use the menu Insert ▷ Formatting ▷ Clear Double Page to insert a clear page break that assures that the next page is a right-hand page (odd-numbered), if necessary by adding a page.

3.5.5.2. Suppressing Page Breaks

To discourage page break at a certain point you can use Insert ▷ Formatting ▷ Prevent Page Break. This is typically useful for paragraphs which should stay together or when you want to keep close the description for tables and pictures in case using floats or boxes is not appropriate.

3.5.6. Forced Line Breaks

Similar to page breaks there are two types of line breaks: one simply breaks the line. You can force this line break within a paragraph by selecting Insert ▷ Formatting ▷ Ragged Line Break or with Ctrl+Retour. Another type that is inserted via the menu Insert ▷ Formatting ▷ Justified Line Break or with Ctrl+Maj+Retour breaks the line and stretches it so that it fills out the whole space between the page margins. This is useful to avoid "fringes" in justified paragraphs due to possible whitespace introduced by line breaks.

You shouldn't use forced line breaks to correct LaTeX's line breaking, as LaTeX is very good at line breaking. There are, however, a number of situations where it is necessary to set a line break actively, for example, in a poem or for an address (see sections 3.3.5.1, 3.3.5.2 and 3.3.8.2).

3.5.7. Horizontal Lines

In the dialog Insert ▷ Formatting ▷ Horizontal Line you can insert horizontal lines. The line offset is the vertical distance between the line and the baseline of the current text line or the paragraph. The line settings can be changed by left-clicking on the line.

3.6. Characters and Symbols

You can directly enter all characters that are available on your keyboard. You can also use special keyboard maps to be able to enter, for example, characters needed for French with an English keyboard. See section 6.19.2 for information on how this is done.

For the case where you need a character that is not on your keyboard, you can use the Symbols dialog via the menu Insert ▷ Special Character ▷ Symbols.

Note: Maybe not all symbols inserted with the symbols dialog can be displayed when you are using a special screen font in L*Y*X's preferences. But the inserted symbols will in every case be displayed in the output.

3.7. Fonts and Text Styles

3.7.1. Font Types

There are two types of fonts:

Vector fonts are built from outlines of the single glyphs (e. g. characters) in the font. This means that each glyph is defined using mathematical curves that are well suited for scaling to any requested size. This mathematical definition is interpreted by the font renderer and the curve is filled out with pixels according to the size and glyph. This means that vector fonts will look pretty good in all sizes. Only at very small sizes where each pixel has to be very carefully computed to provide a good image might it be hard to provide a good rendering. That could mean that one only needs to define one font size and scale them. But to achieve a better quality, many fonts define several font sizes. That improves the appearance because you need more details at large font sizes than at small ones.
The font types `TrueType`, `OpenType`, and `Type 1` are vector fonts.

Bitmap fonts on the other hand, are defined by bitmap graphics from the start; so they will look good at all the sizes they are meant for. However, they don't scale well, because in order to scale a glyph, each pixel is enlarged into several pixels. It is the same effect that happens if you try to enlarge a picture in an image manipulation program. In order to mitigate this effect, bitmap fonts are typically provided in several fixed sizes typically from around 8 pixels high up to 34 pixels or so high in steps according to what is believed to be useful. The advantage of bitmap fonts is that no complicated computations are necessary to display each glyph; so bitmap fonts display therefore more quickly than scalable fonts. The disadvantage is that sizes that don't exist as fixed versions have to be scaled by doubling pixels, and thus look bad.

Bitmap fonts are named `Type 3` in PostScript- and PDF-documents.

The result of all this is that bitmap fonts are best for the size they are designed for, while scalable fonts are good for nearly all sizes. So one needs fewer font size definitions for scalable fonts. That's the reason why nearly all text rendering and typesetting programs use scalable fonts.

To see which fonts are used in a PDF-document, look at its document properties.

Many modern typesetting and markup languages have begun to move towards specifying text styles rather than specifying a particular font. For example, instead of changing to an italicized version of the current font, to emphasize text you use an "emphasized style". This concept fits in perfectly with LyX. In LyX, you do things based on contexts, rather than focusing on typesetting details.

3.7.2. LATEX font support

Traditionally, LaTeX used its own fonts. That is to say, you cannot directly access the fonts installed on your operating system, but you have to use specific fonts provided by your LaTeX distribution. The reason is that LaTeX needs some extra information about the fonts, which have to be provided by additional files and packages. The downside of this is that your font choice is somewhat limited compared to a word processor. On the other hand this comes with the advantage that the provided fonts are generally of very good quality, and that LaTeX files are very portable across different machines. Also, the range of fonts supported by traditional LaTeX has increased a lot in the meantime; so you can find packages for many free and commercial fonts. LyX supports the fonts that are under a free license via the user interface (see section 3.7.3 for details). Other fonts are available if you enter the relevant LaTeX code in the document preamble (please refer to the documentation of your desired font).

Recent developments brought some new LaTeX engines that are also able directly to access fonts that are installed for your operating system, namely XeTeX and LuaTeX. Both engines are supported by LyX. By using them, you can theoretically use any OpenType or TrueType font that is installed on your system. The next section

describes how to use these fonts.

Note: In practice, some fonts might fail due to a legacy (non Unicode) font encoding, bad metrics, or other font deficiencies; so you might have to experiment.

3.7.3. Document Font and Font size

You can set the document fonts in the Document ▷ Settings dialog. In the Fonts section of the dialog, you can specify which font should be used for the three different font shapes — roman (serif), `sans serif` and `typewriter` (monospaced) — and you can specify the base font size and scaling factors for (some) sans serif and typewriter fonts if this is necessary to fit with the roman font.

If you select Use non-TeX fonts, you will have access to the fonts installed on your operating system. This requires that you use PDF (XeTeX), PDF (LuaTeX) or DVI (LuaTeX) as the output format, i. e. you will have to have either XeTeX or LuaTeX installed (see section 3.7.2). You will then not have access to TeX's own fonts. Note that LyX then lists all available fonts in each of the three lists (roman, sans serif, and typewriter), since LyX cannot determine the family. Also note that the output might fail with some of the listed fonts, due to the encoding of the fonts and/or font failures. LyX cannot determine this in advance, so you might need to experiment.

If you use TeX fonts (which is the default), the possible options for the font include Default and a list of fonts available with your LaTeX distribution. If you select Default, the font that is preset by the current document class is used. With LyX's automatic font encoding, this is, depending on the document language, either the standard TeX font "`Computer Modern`" (`cm`) or a look-alike of this font: either "`cm-super`" or the bitmap font "`European Computer Modern`" (`ec`). However, some classes set different default fonts.

As `ec` is a bitmap font, it looks pixelated in PDF output, especially when you read the PDF in a zoomed size.[6] To get rid of pixelated fonts, you have to use a vector font. Depending on how your document should look, you can either:

- select the Latin Modern fonts, which is the recommended choice if you want to keep the look of `cm`/`ec`. Latin Modern was developed for the LaTeX community in order to replace `cm` as the default font. It covers a huge range of glyphs and several font shapes. Except for some details, where the appearance was improved, Latin Modern looks identical to `cm`.[7]

- If you do not like the look of `cm`/`ec`, you can of course select one of the other vector fonts provided, e. g. `Times Roman` or `Palatino`. Most roman vector fonts

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[6]This problem is less severe if you read PDFs in `Adobe Reader` version 6 or later, because this program includes a special bitmap font renderer.

[7]One difference is improved kerning.

will automatically select matching sans serif and typewriter fonts,[8] but you can also select your own.

The differences between roman, `sans serif` and `typewriter` fonts are explained in section 3.7.6.

The font Times Roman was originally designed for newspapers. Its glyphs are thus smaller than glyphs from other fonts in order to fit into the small newspaper columns. Therefore Times Roman is not the optimal choice for larger documents like books.

For the font size there are generally four possible values: Default, 10, 11 and 12. Some classes provide additional sizes. The size of Default depends on the class you are using. In the standard classes it is equal to the font size 10.

Note that the font size is the *base size.* That means that LyX scales all other possible font sizes (such as those used in footnotes, super-, and subscripts) by this value. You can fine-tune the font size of text parts via the Text Style dialog if needed. The possible font sizes for text parts are explained in section 3.7.6.

The Default Family selection lets you specify whether the base font of your document should be roman, sans serif or typewriter. The Default selection uses what is preset by the class, the other selections override this. In most cases, Default is equal to roman, but some classes (such as presentation classes) use other defaults.

The LaTeX font encoding selection is an expert setting which lets you change the value passed to the LaTeX-package **fontenc**. Normally, you do not need to change (or even understand) this. Unless you have specific reasons, use Automatic.

With some fonts, the checkboxes Use Old Style Figures and Use True Small Caps are available. These are extra features some fonts provide. If Use Old Style Figures is checked, old style figures (also known as medieval or text figures) are used. Old style figures are the numerals $(0-9)$ with ascenders and descenders, which makes them fit nicely with lowercase letters. Use True Small Caps determines that real small caps are used instead of faked small caps made of scaled capitals. Real small caps are often part of expert font sets; they generally look better than faked small caps but might have to be purchased separately.

Furthermore, with some fonts, you can add additional (comma-separated) options provided by the font package (or the fontspec package, if you use non-TeX fonts), into the Options field. This presupposes that you are familiar with the respective LaTeX font package.

The field CJK allows users of the languages Chinese, Japanese, Korean (CJK) to specify a font to display the script characters.[9]

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[8]These are sometimes just matching other fonts (e. g., Times Roman selects Helvetica for sans serif text), or different shapes of the same font, i. e. a real font *family* (e. g. in case of Latin Modern oder Computer Modern).

[9]The font will be the argument for the commands of the LaTeX-package **CJK**. So this has no effect

The option **Enable micro-typographic extensions** activates extensions such as character protrusion and font expansion via the LaTeX-package **microtype**.

The option **Disallow line breaks after dashes** outputs en- and em-dashes as literal characters[10] instead of ligatures (--, ---) (see section 3.9.2).

Note: When you choose a new font or font size, L_YX does *not* change the screen font! You will only see a difference in the printed output; this is part of the WYSIWYM concept. L_YX's screen fonts can be adjusted in the Tools ▷ Preferences dialog, see section C.1.3.

3.7.4. Math Fonts

In LaTeX the font used for characters in equations is different from the document font. For the case that you use TeX fonts for your document, you can explicitly choose a math font in the dialog Document ▷ Settings. The default setting is that L_YX automatically selects a math font. For most cases this will be LaTeX's default – the math variant of LaTeX's default font family "`Computer Modern`". L_YX will automatically only load another math font if a math variant of the document font is available.

Note that the math font will not be used for *mathematical text* (which is inserted with the shortcut Alt+C Espace or by the insertion of the command **\text** into a formula). Also note that some math fonts are sans serif. Your document might therefore look strange when the document text has serifs while the math characters do not. Sans serif math fonts make therefore in most cases only sense if you select Sans Serif for the Default family in the document font settings.

If you use non-TeX fonts for the document, you can only choose for math to use either the document's class default TeX font (in most cases "`Computer Modern`") or to use the non-TeX variant of the document's class default font (in most cases "`Latin Modern`").

3.7.5. Using Different Text Styles

As we've already seen, L_YX automatically changes the style for certain paragraph environments. In this section, we will explain how the style of selected text passages can by changed. This is where we meet the concept of *text styles.*

By default, L_YX supports two text styles, *Emphasized* and Noun. These are *builtin*, i. e., available with all document classes. On top of that, some document classes and

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for the document language Japanese that does not use **CJK**.

[10]Or LaTeX macro, if the literal character is not supported by the LaTeX input encoding.

modules provide *custom text styles* for specific purposes. We describe both types of text styles in a minute.

Before we do that, though, allow us just a few words of what we mean by *text styles* in contrast to *text properties*. Traditional word processors used to focus on so-called *formal markup*: if you wanted to emphasize a word, you selected it and chose e. g. "bold style" — you customized the *text properties*. Modern processors, LyX among them, encourage the use of *semantic* (or *logical*) *markup* instead (although formal markup is still possible; see section 3.7.6). Rather than fiddling with *text properties*, they encourage the use of *text styles*, who are defined with regard to their function (e. g., 'emphasize'), not their form ('bold'). There are many advantages of the semantic approach. To begin with, using functional categories keeps you thinking about why you are actually marking up, if your markup is consistent and systematic, and whether this particular markup makes sense. On a more practical level, it is easy to change the appearance if needed. Consider the case when you are writing a paper and set all proper names in SMALL CAPS via formal markup. Now if the publisher requests to have names appear differently (e. g., in normal font, or ALL-CAPS), you would have to change any single occurrence. With a semantic markup (such as NOUN; see below), you'd just need to change the definition of Noun once and for all. It's a ten second change (if you know how to change the LaTeX definition). Moreover, semantic markup even allows you to produce different versions of a document, using different markup semantics.

With that in mind, we now turn to the semantic text styles that are provided by LyX.

3.7.5.1. Builtin Text Styles

The two builtin text styles can be activated via the Text Properties dialog, key bindings, and the toolbar.

To activate the Noun style, do one of the following:

- click on the toolbar button
- use the key binding Alt+C C
- use the Text Properties dialog (Édition ▷ Propriétés du texte ▷ Personnaliser… or) under Semantic Markup.

This command is a toggle. That is, if Noun style is already active, they deactivate it.

One typically uses the Noun style for proper names. For example: "MATTHIAS ETTRICH is the original author of LyX."

By default, Noun is producing text in SMALL CAPS, but the definition can be changed.

A more widely used text style is the Emphasized style. You can activate (or deactivate
— it's also a toggle) the Emphasized style by:

- clicking on the toolbar button 🅰

- using the keybindings Ctrl+E

- use the Text Properties dialog (Édition ▷ Propriétés du texte ▷ Personnaliser... or
  🔤) under Semantic Markup.

Normally the Emphasized style is equivalent to an italic font but some document
classes or LATEX packages use a different font, and you can also customize it yourself
by changing the LATEX definition.

We've been using the Emphasized style all over the place in this document. Here's
one more example:

> *Do not overuse text styles!*

It's also a warning in addition to an example. One's writing should parallel ordinary
conversation. Since we don't all constantly scream at each other, we should also avoid
the common tendency to overuse text styles.

In contrast to the custom text styles, the builtin styles are represented only as font
changes and integrated in the Text Properties dialog. You can therefore always reset to
the default font using the key binding Alt+C Espace or that dialog (Édition ▷ Propriétés
du texte ▷ Personnaliser... or 🔤).

3.7.5.2. Custom Text Styles

Custom text styles can be provided by the document class, a module (see sec-
tion 3.1.2.3), or local layout settings (see section 3.1.2.4). As the two builtin styles,
they provide *semantic* markup for specific functions. For instance, LYX ships a *Lin-
guistics* module that provides, among other things, some custom text styles to markup
linguistic levels: *expressions*, CONCEPTS, and 'meanings'.

These styles can be found, if available, in the Edit ▷ Custom Text Styles menu.

For the purpose of demonstration, we have loaded in this document the optional
module Logical Markup that replicates and extends the two builtin styles. By example
of the emphasized style, we can see the differences in look and feel (although the
result in the typeset output is the same): while the builtin *emphasized style* appears
as normal font change, the custom text style *Emph* appears as an inset, with a label
below that identifies its semantics. This is the way all custom text styles look and
feel like. For instance, the three others from the module we have loaded are: `Code`,
Strong, and NOUN. Note that custom text styles might (as in the example) or might
not emulate on screen their formal appearance.

3.7.6. Tweaking Text with the Text Properties Dialog

There are always occasions when you will need to do some formal fine-tuning; so LyX gives you a way to customize the properties of text passages. For example, an academic journal or a corporation may have a style sheet requiring a sans-serif font be used in certain situations. Also, writers sometimes use a different font to offset a character's thoughts from ordinary dialog.

If there are no custom text styles provided by the document class or a module for this purpose (which is, as written above, generally the better way of handling such issues), you often find yourself wanting to quickly tweak the properties of the respective text passages. That's where *formal markup* comes in as a last resort.

Before we document how to tweak the text properties, we want to issue a warning yet again: Don't overuse that!
Documents that overuse different fonts and sizes are not easy to read and tend to look as if someone has knocked huge holes in them.

To tweak text properties, open the Édition ▷ Propriétés du texte ▷ Personnaliser… dialog or press the toolbar button . There are several combo boxes in this dialog, each corresponding to a different text property that you can choose. You can choose an option for one of these properties, or select No change, which keeps the current state of that property. The item Default will reset the property to whatever is the default. You can use this to reset attributes across a bunch of different paragraph environments all at once.

The Text Properties, and their options (in addition to No change and Default) are:

Family   The "overall look" of the font. The possible options are:

Roman   This is the Roman font family. Normally a serif font. It's also the default family. (key binding Alt+C R)

Sans Serif   This is the Sans Serif font family. (key binding Alt+C S)

Typewriter `This is the Typewriter font family.` (key binding Ctrl+Maj+P)

The general differences of these families are:

- Serif fonts use characters with serifs. These are the small "appendices" at the ends of the strokes that form the character. The following example shows the difference:
  text with serifs
  text without serifs
  Serifs facilitate quick and easy reading. These fonts are therefore used as default (named roman).

- Sans serif is not recommended for use as a base type. This font type is therefore often only used for headings and short texts. We use it

in this document to highlight menu names.

- **Typewriter** is a so called "monospaced" font, which means every character has the same width; the "i" is as wide as the "m". Here is an example
  ```
  typewriter text
  ```
  no typewriter text

Series   This corresponds to the print weight. Options are:

    Medium   This is the Medium font series. It's also the default series.

    Bold   **This is the Bold font series.** (key binding Ctrl+Alt+B)

Shape   As the name implies. Options are:

    Upright   This is the Upright font shape. It's also the default shape.

    Italic   *This is the Italic font shape.*

    Slanted   *This is the Slanted font shape* (although it might not be visible in LyX, this is different from italic).

    Small Caps   THIS IS THE SMALL CAPS FONT SHAPE.

Size   Alters the size of the font. You won't find numerical values here; all possible sizes are actually proportional to the document font size. Once again, you don't feed LyX the details, but a general description of what you want to do. The options are:

    Tiny   <small>This is the "Tiny" font size.</small> (key bindings Alt+S T, Alt+S 1)

    Smallest   <small>This is the "Smallest" font size.</small> (key binding Alt+S 2)

    Smaller   This is the "Smaller" font size. (key bindings Alt+S Maj+S, Alt+S 3)

    Small   This is the "Small" font size. (key bindings Alt+S S, Alt+S 4)

    Normal   This is the "Normal" font size. It's also the default size. (key bindings Alt+S N, Alt+S 5)

    Large   This is the "Large" font size. (key bindings Alt+S L, Alt+S 6)

    Larger   This is the "Larger" font size. (key bindings Alt+S Maj+L, Alt+S 7)

    Largest   This is the "Largest" font size. (key binding Alt+S 8)

    Huge   This is the "Huge" font size. (key bindings Alt+S H, Alt+S 9)

Huger ## This is the "Huger" font size. (key bindings Alt+S Maj+H, Alt+S 0)

Increase This increases the size by one step (for instance, from "Largest" to "Huge"). (key binding Alt+S +)

Decrease This decreases the size by one step (for instance, from "Normal" to "Small"). (key binding Alt+S -)

We warn you *yet again*: don't go crazy with this feature. You should almost never need to change the font size. LyX automatically changes the font size for different paragraph environments — use those instead. This is here for fine-tuning only!

Another combo box allows to tweak Decoration:

Color Alters the text color. Note that not all DVI viewers are able to display colors. Besides (Without), which means that the document default color set in Document ▷ Settings ▷ Color for Main text is used, you can select Black, White, Red, Green, Blue, Cyan, Magenta, Yellow, Brown, Darkgray, Gray, Lightgray, Lime, Orange, Olive, Pink, Purple, Teal and Violet text.

Underlining Here you can have text passages being underlined. Avoid using underlining if you can! It is a hangover from the typewriter days, when you could not change fonts. One no longer needs to emphasize text by underscoring characters. This is only possible in LyX because some people *may* need it in order to follow style sheets for journal submissions. Options are:

(Without) Don't use underlining.

Single This is text with Single underlining on. (key binding Ctrl+U, Alt+C U)

Double This is text with Double underlining on. (key binding Alt+C D).

Wavy This is text with Wavy underlining on. (key binding Alt+C W) Use this only if a journal absolutely insists on it. Keep antinausea pills handy.

Strikethrough lets you strike-through text passages in two ways:

(Without) Don't use strikethrough.

Single ~~This is text with Single strikethrough on.~~ (key binding Ctrl+Maj+O) This is frequently used to indicate an older version of text that has been changed in the meantime.

With / This is text with strikethrough on. This is used to make text hardly readable.

A drop-down menu allows to change the parameters for the

Language   This is used to mark regions of text as having a different language from the language of the document. Text marked in this way will be underlined in the LyX workarea in blue to indicate the change.

If you have for example, an extract of German text in a non-German document, LaTeX respects the German hyphenation rules automatically. When using the spell checking (see section 6.15) the German-marked text will be checked according to the German dictionary.

If you do not want text passages to be spellchecked, activate Exclude from Spellchecking. Passages marked like this will still be hyphenated correctly.

In addition to all the formal markup described above, the dialog also provides you access to the two builtin semantic text styles (see section 3.7.5.1) under Semantic Markup:

- Emphasized: *This is text with emphasize on.*

- Noun: THIS IS TEXT WITH NOUN ON.

So you have a huge number of combinations to select from. Once you have applied a text property via the Édition ▷ Propriétés du texte ▷ Personnaliser... ( ) dialog, the settings are temporarily saved. You can activate the last applied properties by using the toolbar button . The button lets you apply those even when the dialog isn't visible. A press on the button will apply the most recent setting again, a press on the down-arrow will open a menu with the (max. 20) most recently applied settings, from which you can select one.

To completely reset the text properties of a selection to the default, use either Alt+C Espace or select Reset to default from the menu of the toolbar button .

We conclude this section with the same warning once again: Do not overuse the fonts! They are, more often than not, a kludge and a bad substitute for good writing.

3.8. Printing and Previewing

3.8.1. Overview

Now that we have covered some of the basic features of document preparation using LyX, you probably want to know how to print out your masterpiece. Before we tell you that, we want to give you a quick explanation of what goes on behind-the-scenes. We cover this information in much greater detail in the *Additional Features* manual as well.

LyX uses the program LaTeX as its backend. LaTeX is just a macro package for the TeX typesetting system, but to prevent confusion, we will only refer to LaTeX. LyX is what you use to do your actual writing. Then, LyX calls LaTeX to turn your writing into printable output. This happens in two stages:

1. First, LyX converts your document to a series of text commands for LaTeX, generating a file with the extension, ".tex".

2. Next, LyX calls LaTeX to use the commands in the .tex file to produce printable output.

3.8.2. Output file formats

3.8.2.1. Plain text

This file type has the extension ".txt". It contains your document as plain text in UTF-8 encoding.

You can export your document to plain text with the menu File ▷ Export ▷ Plain text. However, this will not export any externally generated material such as a BibTeX bibliography (section 6.6.2). If your document includes such material, use File ▷ Export ▷ More Formats & Options and then select Plain text (ps2ascii). This will first internally export your document to PostScript (generating thereby the external material) and then do the conversion to plain text.

3.8.2.2. LaTeX

This file type has the extension ".tex" and contains all commands that are necessary for the LaTeX program to process your document. If you know LaTeX, you can use it to find out LaTeX-Errors or to process it manually with console commands. The LaTeX-file is automatically created in LyX's temporary directory whenever you view or export your document.

You can export your document as a LaTeX-file using the menu File ▷ Export ▷ LaTeX. The different LaTeX export variants are explained in section A.1.15.

3.8.2.3. DVI

This file type has the extension ".dvi". It is called "device-independent" (DVI), because it is completely portable; you can move them from one machine to another without needing to do any sort of conversion. DVIs are used for quick previews and as a pre-stage for other output formats, like PostScript.

DVI files do not contain images, they only link to them. So don't forget to deliver the images together with your DVIs. Because the DVI-viewer has to convert the images in the background to make them visible when you scroll the DVI, this can slow down your computer when you view the DVI. So we recommend using PDF for files with many images.

You can export your document to DVI by the menus File ▷ Export ▷ DVI or File ▷ Export ▷ DVI (LuaTeX). The latter option uses the program LuaTeX. LuaTeX is an

63

engine that provides direct Unicode support and support for direct font access (see section 3.7.2). LuaTEX is still a work in progress, but it might develop into the next standard TEX processor.

3.8.2.4. PostScript

This file type has the extension ".ps". PostScript was developed by the company `Adobe` as a printer language. The file therefore contains commands that the printer uses to print the file. PostScript can be seen as a "programming language"; you can calculate with it and draw diagrams and images.[11] As a result of this, the files are often bigger than PDFs.

PostScript can only contain images in the format "Encapsulated PostScript" (EPS, file extension ".eps"). As LYX allows you to use any known image format in your document, it has to convert them in the background to EPS. If, for example, you have 50 images in your document, LYX has to do 50 conversions when you view or export your document the first time. This might slow down your workflow with LYX. So if you plan to use PostScript, you can insert your images directly as EPS to avoid this problem.

You can export to PostScript using the menu File ▷ Export ▷ PostScript.

3.8.2.5. PDF

This file type has the extension ".pdf". The "Portable Document Format" (PDF) developed by `Adobe` was derived from PostScript. It is more compressed and it uses fewer commands than PostScript. As the name "portable" implies, it can be processed on any computer system and the printed output looks exactly the same.

PDF can contain images in its own PDF format and in the formats "Joint Photographic Experts Group" (JPG, file extension ".jpg" or ".jpeg") and "Portable Network Graphics" (PNG, file extension ".png"). You can also use any other image format, because LYX converts them in the background to one of these formats. But as described in the section about PostScript, the image conversion will slow down your workflow. So we recommend using images in one of the three formats mentioned above.

You can export your document to PDF via the menu File ▷ Export in different ways:

PDF (pdflatex) This uses the program `pdftex` which converts your file directly to PDF.

PDF (LuaTeX) This uses the program LuaTEX which converts your file directly to PDF. LuaTEX is a new engine, derived from `pdflatex`, that also provides direct Unicode support and support for direct font access (see section 3.7.2). LuaTEX

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[11]If you are interested in learning more about this, have a look at the LATEX-package **pstricks**.

is still a work in progress, but it might develop into the next standard TEX processor.

PDF (XeTeX) This uses the program XeTeX that converts your file directly to PDF. XeTeX is a new engine that provides direct Unicode support and support for direct font access (see section 3.7.2). It is particularly good at typesetting different scripts, for example, vertically written Japanese.

PDF (cropped) This is the same as PDF (pdflatex) but the result is a PDF with cropped page margins. This is for example useful if you want to use LyX to generate good-looking formulas to use them in other programs like for presentations.

PDF (dvipdfm) This uses the program dvipdfm that converts your file in the background to DVI and in a second step to PDF.

PDF (ps2pdf) This uses the program ps2pdf that creates a PDF from a PostScript-version of your file. The PostScript-version is produced by the program dvips which uses a DVI-version as intermediate step. So this export variant consists of three conversions.

We recommend using PDF (pdflatex) because pdftex supports all the features of actual PDF-versions, is quick, stable, and works without problems. If you rely on multiscript support and/or specific OpenType fonts, you might want to try out PDF (XeTeX) or PDF (LuaTeX) instead, bearing in mind that these two programs are not yet as mature as pdflatex.

3.8.2.6. XHTML

This file type has the extension ".xhtml". It is a file suitable for viewing in web browsers. It does not itself contain images and the like but only links to them. When LyX produces XHTML, it also generates corresponding images in formats suitable for the purpose. For the math output you can choose in the menu Document ▷ Settings ▷ Output between different formats, which are described in section *Math Output in XHTML* of the *Additional Features* manual.

XHTML output remains "under development", and not all LyX features are supported yet. See the chapter *LyX and the World Wide Web*, in the *Additional Features* manual, for more information.

You can export your document as an XHTML file using the menu item File ▷ Export ▷ LyXHTML.

3.8.3. Previewing

To get a look at the final version of your document, with all of the page breaks in place, the footnotes correctly numbered, and so on, use the menu Document and

choose View or use the toolbar button ⚇. A viewing program will pop up showing the output in the defined default output format, which is globally set in the preferences (see section C.7.2) and can also be altered for single documents in the document settings (see section B.21). Further output formats can be selected via Document ▷ View (Other Formats) or the toolbar button ▧.

If you have changed your document, you can refresh the output in the same viewer window using the menu Document ▷ Update or Document ▷ Update (Other Formats), respectively.

When you preview a file, the output file is only generated in LYX's temporary directory. To have a real output, export your document.

3.9. A few Words about Typography

3.9.1. Hyphens, Dashes and Minus Signs

In LYX, the "-" symbol comes in four variants: the *hyphen*, the *en dash*, the *em dash*, and the *minus sign*:

name	output	inserted with
hyphen	-	"-" in text
en dash	–	system key combination[a] or "--" in text
em dash	—	system key combination or "---" in text
minus sign	−	"-" in math mode

[a]On Mac and Linux, the en dash is entered with Opt+"-" and the em dash with Shift-Opt+"-" (Opt is the Mac label for the right Alt key).

Dashes can also be inserted with Insert ▷ Special Character ▷ Symbols or using the `unicode-insert` LYX function with the Unicode code point as argument (2013 for the em dash and 2014 for the en dash).

Hyphen and dashes are distinct from the minus sign, which appears in math mode and has a length of its own. Here are some examples:

1. line- and page-breaks   (*hyphen*)

2. A–Z; pages 369–378   (*en dash*)

3. The em dash is used without spaces: Oh—there's a dash.   (*em dash*)

4. $x^2 - y^2 = z^2$ (*minus sign*)

See also the Wikipedia entry on dashes.

3.9.2. Dashes and Line Breaks

Whether line breaks before or after dashes are allowed depends on the use case and locale, e. g.:

- In English, line breaks are generally allowed after the dash, but no line break should occur if only a single character follows the dash (as in A–Z).

- In English, dashes used to set off parenthetical statements should not start a new line.

- In French and Spanish, dashes around parenthetical statements are treated similar to brackets: line breaks are not allowed on the inner side.

By default, dashes are output by LYX to LATEX as "ligature dashes" (-- and ---). LATEX allows line breaks after hyphens and these en-dashes and em-dashes.

1. Line breaks before spaced en dashes – common in British English and generally recommended by *The Elements of Typographic Style* – can be prevented using non-breaking spaces.

2. Unwanted line breaks **after** dashes must be prevented by wrapping in a make-box[12] or preceding with **\nobreakdash** in TEX code, a non-breaking space does not suffice. Examples[13]:

    - Pages 36–39

    - Les incises – même si tout le monde ne les aime pas – sont très utiles.

    - En una frase —un inciso con rayas— se escribe así.

An incorrect line break is easily overlooked because – in contrast to an overfull line – it does not trigger a warning in the LATEX log.

If you want to globally disable line breaks after dashes, you can select the option Document ▷ Settings ▷ Fonts ▷ Disallow line breaks after dashes:

1. Line breaks are still allowed after spaced dashes. They can be prevented using non-breaking spaces (without need for a makebox or TEX code). Example:

    - Les incises – même si tout le monde ne les aime pas – sont très utiles.

2. Line breaks after unspaced dashes can be allowed via the menu Insert ▷ Formatting ▷ Optional line break:

---

[12]See section *Prevent Hyphenation* of the *Embedded Objects* manual.

[13]It is generally recommended to set the correct language for text parts not in the document language. We don't do this here to prevent a dependency on LaTeX support for French and Spanish.

- Em-dashes without spaces—common in American English—should be followed by a line break opportunity.

This also allows hyphenation of the word following the dash (see section 3.9.3).

3. With this setting, L^AT_EX hyphenates words also if immediately followed by em or en dashes (see section 3.9.3).

3.9.2.1. Changes and Backwards Compatibility

Up to L_YX 2.1, consecutive hyphen characters (-- and ---) in the L_YX source were merged to en or em dashes by LaTeX. These "ligature dashes" retain the line-break properties of hyphens while literal dash characters are regarded by L^AT_EX as *non-breakable.*

Since L_YX 2.2, consecutive hyphens in the L_YX source are exported to L^AT_EX in a way that prevents ligation to dashes. "Ligature dashes" in documents from earlier versions are converted to literal dash characters (except in `typewriter` font); typed in consecutive hyphens are merged to dash characters immediately after the input (unless the current text font is `typewriter`).[14]

L_YX 2.3 outputs *breakable* dashes by default. When opening documents edited with L_YX 2.2 or earlier and containing literal dash characters not followed by whitespace, the setting Document ▷ Settings ▷ Fonts ▷ Disallow line breaks after dashes is active to prevent changes to the line breaks.**Warning:** If you used both literal and "ligature" dashes in pre-L_YX 2.2 documents, you may need to enable or prevent individual line breaks as shown above to restore the correct line breaking behavior.

3.9.3. Hyphenation

Words are not hyphenated within L_YX but automatically in the output. Hyphenation is done by the L^AT_EX-package **babel** following the rules of the document language. L^AT_EX does not hyphenate text in the typewriter font and words immediately preceded or followed by hyphens or dashes.

L^AT_EX hyphenates almost perfectly; it only has problems with text in the typewriter font and with unusual constructs, like "h3knix/m0n0wall". If L^AT_EX cannot break a word correctly, you can set hyphenation points manually. This is done with the menu Insert ▷ Formatting ▷ Hyphenation Point. Note that adding hyphenation points disables the default ones: The word will no longer break at the places it previously would have. Note also that, other than with "soft hyphens" that are common in word processors, these added hyphenation points are only recommendations to L^AT_EX. If

---

[14]The behavior was changed since "lyx --help" became "lyx –help" in PDF, Postscript, and DVI output. An unintended consequence of these changes was that all dashes were output as non-breakable dashes. This also resulted in changed line breaks in some older documents.

no hyphenation is necessary or the automatic hyphenation is disabled, LaTeX will ignore them.

If there is a word you use often that LaTeX does not hyphenate correctly, you can tell LaTeX how to hyphenate it by adding the command `\hyphenation{<patterns>}` to the preamble which takes as its argument one or more words with their hyphenation points marked by a hyphen, e. g.: `\hyphenation{dis-quo-ta-tion dis-quo-ta-tions}` You can also use this to prevent hyphenation of a word, e. g. `\hyphenation{unbroken}`. If there are a lot of these hyphenation exceptions, you can collect them in a single file (say, `myhyphens.sty`) and then import the file via: `\usepackage{myhyphens}`. Make sure to put the file somewhere LaTeX can find it (see the section *Installing new LaTeX files* in the *Customization* manual).

Note that `\hyphenation{<patterns>}` applies to the language that is current when the command is issued (in the preamble, this is usually the main language of the document). If you want to define patterns for specific languages without knowing which language is in effect, the language packages babel and polyglossia provide specific variants of the command:

- babel: `\babelhyphenation[<language 1>, <language 2>, ...]{<patterns>}`

- polyglossia: `\pghyphenation[<language options>]{<language>}{<patterns>}`

So you can use, depending on which language package you are using:

- `\babelhyphenation[german,ngerman,austrian,naustrian,swissgerman, nswissgerman]{Ma-de}`

- `\pghyphenation{german}{Ma-de}`

in order to define the hyphenation points for all German varieties, or only

- `\babelhyphenation[naustrian]{Ma-de}`

- `\pghyphenation[variant=austrian]{german}{Ma-de}`

in order to define them only for the Austrian variety of German.

These commands only work after the language package has been loaded, which is usually after the user preamble. So it is advised that you embrace them in `\AtBeginDocument{...}`, which causes them to be issued at the end of the LaTeX preamble instead.

Sometimes you want to prevent words or constructs from being hyphenated. Imagine that you are describing keybindings/shortcuts in your document in the form "A-b c". LaTeX would then see the hyphen "-" as a line break possibility. A line break at this point would look ugly. To prevent the shortcut from being broken, you can use a non-breaking hyphen (Insert ▷ Special Character ▷ Non-Breaking Hyphen) or put it into a makebox as described in the section *Prevent Hyphenation* of the *Embedded Objects* manual.

3.9.4. Punctuation Marks

3.9.4.1. Abbreviations and End of Sentence

When L_YX calls LaTeX to generate the final version of your document, LaTeX automatically distinguishes between words, sentences, and abbreviations. LaTeX then adds the "appropriate amount of space." That means sentences get a little bit more space between the period and the next word. Abbreviations get the same amount of space after the period that a word gets after another word.

Unfortunately, the algorithm for figuring out what's an abbreviation does not work in all cases. If a "." is at the end of a lowercase letter, it's the end of a sentence; if it's at the end of a capitalized letter, it's an abbreviation.

Here are some examples of *correct* abbreviations and of the end of a sentence:

- M. Butterfly

- Don't worry. Be happy.

And here is an example of the algorithm going wrong:

- e. g. this is too much space!

- This is I. It's okay.

You will not see anything wrong until you view a final version of your document.

To fix this problem, use one of the following:

1. Use an Inter-word Space after lowercase abbreviations (see section 3.5.2.1).

2. Use a Thin Space between two tokens of an abbreviation (see section 3.5.2.2).

3. Use an End of sentence period found under the Insert ▷ Special Character menu to force the use of inter-sentence spacing. This function is also bound to Ctrl+. for easy access.

With the corrections, our earlier examples look like this:

- e. g. this is too much space!

- This is I. It's okay.

Some languages don't use extra spacing between sentences. If your language is such a language, you don't need to worry, because LaTeX will take care of this.

For those that do need to bother, there is help to catch those sneaky errors: Check out the Check TeX feature described in the section *Checking TeX* of the *Additional Features* manual.

3.9.4.2. Quotation Marks

LYX usually sets quotation marks correctly. Specifically, it will insert an opening mark at the beginning of quoted text, and use a closing mark at the end. For example, "open close". The keyboard character, ", generates this automatically.

You can specify what character the " key produces by using the submenu Language of the Document ▷ Settings dialog and switching the Quote Style (note that LYX makes a sensible proposal for the selected main language). There are 15 choices:

"Outer" and 'inner'　　Produces "these outer" and 'these inner' quotation marks (as common, e. g., in the US)

"Outer" and 'inner'　　Produces "these outer" and 'these inner' quotation marks (as common, e. g., in Sweden)

„Outer" and ‚inner'　　Produces „these outer" and ‚these inner' quotation marks (as common, e. g., in Germany)

„Outer" and ‚inner'　　Produces „these outer" and ‚these inner' quotation marks (as common, e. g., in Poland)

«Outer» and ‹inner›　　Produces «these outer» and ‹these inner› quotation marks (as common, e. g., in Switzerland)

»Outer« and ›inner‹　　Produces »these outer« and ›these inner‹ quotation marks (as common, e. g., in Denmark)

"Outer" and 'inner'　　Produces "these outer" and 'these inner' quotation marks (so-called plain or non-typographical quotation marks)

'Outer' and "inner"　　Produces 'these outer' and "these inner" quotation marks (as common, e. g., in Great Britain)

«Outer» and "inner"　　Produces «these outer» and "these inner" quotation marks (as common, e. g., in France)

«Outer» and «inner»　　Produces «these outer» and «these inner» quotation marks (another style common in France)[15]

«Outer» and „inner"　　Produces «these outer» and „these inner" quotation marks (as common, e. g., in Russia)

»Outer» and 'inner'　　Produces »these outer» and 'these inner' quotation marks (another style common in Sweden)

„Outer" and »inner«　　Produces „these outer" and »these inner« quotation marks (as common in Hungary)

---

[15]Maybe you wonder why one does not simply use only outer marks in this case, since these look identical to the inner marks. The answer is that you cannot easily switch to another style then (where the inner marks differ).

⌈Outer⌋ and ‖inner‖   Produces ⌈these outer⌋ and ‖these inner‖ quotation marks (as common, e. g., in Japan)[16]

《Outer》 and 〈inner〉   Produces 《these outer》 and 〈these inner〉 quotation marks (as common, e. g., in North Korea and China)[16]

"Outer„ and 'inner,   Produces "these outer„ and 'these inner, quotation marks (as common in Israel)

Inner quotation marks[17] for quotations inside quotations (and other tasks in some languages, such as 'scare quotes') can be obtained by means of the shortcut Alt+" and via the Insert ▷ Special Characters menu.

By default, the quotation mark styles are persistent. That is to say, a quotation mark maintains the style that was current when it was inserted, even if the document-wide style changes. This allows you to enter marks of different style. If you check the setting Use dynamic quotation marks in Document ▷ Settings ▷ Language, however, special quotation marks will be inserted (in the LyX window, they appear in a special color). These marks will automatically adapt to the main style (and its changes). Such quotation marks make it easy to alter the quotation mark style in one step (e. g., if your publisher requests a different style).

Individual quotation marks (i. e., their level [inner, outer], side [opening, closing], and style) can be easily switched by a context menu that pops up if you right-click on a mark.

3.9.5. Ligatures

It is standard typesetting practice to group certain letters together and print them as single characters. These groups are known as *ligatures*. Since LaTeX knows about ligatures, your documents will contain them too in the output. Here are the standard ligatures:

- ff
- fi
- fl
- ffi
- ffl

---

[16]Note that these characters are just emulated with similar-looking math symbols in many encodings that do not cover these glyphs.

[17]In many writing cultures, these are single quotation marks. But as the British and French styles show, this is not necessarily the case (and specifically the British style shows that "outer" does not necessarily mean "double"). This is why we call them 'inner' as opposed to "outer" quotation marks.

Some languages uses other ligatures if the document font supports them.

Sometimes, you don't want a ligature in a word. While a ligature may be okay in the word, "graffiti," it looks really weird in compound words, such as "cufflink" or the German "Dorffest." To break a ligature, use Insert ▷ Formatting ▷ Ligature Break. This changes "cufflinks" to "cufflinks" and "Dorffest" to "Dorffest".

3.9.6. LyX and LaTeX Logos

Via Insert ▷ Special Characters ▷ Logos, LyX provides the following program logos with special formatting:

LyX The name of the game.

TeX The typesetting engine used by LyX.

LaTeX The TeX macro collection used by LyX.

LaTeX 2$_\varepsilon$ The current version of LaTeX.

You might wonder why the LaTeX version is "2ϵ". It is an old tradition in the TeX world to give programs geek version numbers. For example the version number of TeX converges to the number π: The actual version is "TeX-3.141592", the previous one was "TeX-3.14159".

3.9.7. Units

Generally the space between units and the number is smaller than the normal space between two words. As you can see in the example below, it looks better when the space is smaller. To get such a "half space" for units use the menu Insert ▷ Formatting ▷ Thin Space (shortcut Ctrl+Maj+Espace).

Here is an example to show the differences:

24 kW·h   space between number and unit
24 kW·h   half space between number and unit

3.9.8. Widows and Orphans

In the early days of word processors, page breaks went wherever the page happened to end. There was no regard for what was actually going on in the text. For example the heading for a new section was printed at the very bottom of the page, the first line of a new paragraph all alone at the bottom of a page, or the last line of a paragraph at the top of a new page. These bits of text became known as *widows* and *orphans*.

Clearly, LyX can avoid breaking pages after a section heading. That's part of the advantage of paragraph environments. But what about widows and orphans, where

the page breaks leave one line of a paragraph all alone at the top or bottom of a page? There are rules built into LaTeX governing page breaks, and some of those rules are there specifically to prevent widows and orphans. If they appear nevertheless and you don't like them, you can add the commands

\widowpenalty=10000
\clubpenalty=10000

to the LaTeX preamble of your document to avoid them. Some LaTeX books (such as [1] or [2]) have more information about the technical details of LaTeX's page break mechanism.

4. Notes, Graphics, Tables and Floats

The issues of this chapter are described in detail in the *Embedded Objects* manual. There you will also find tips and tricks for special cases.

4.1. Notes

L_YX offers you a few types of notes to add to your document:

L_YX Note This note type is for internal notes that will not appear in the output.

Comment This note also doesn't appear in the output but it does appear as a L^AT_EX-comment when you export the document to L^AT_EX via the menu File ▷ Export ▷ LaTeX (xxx).

Greyed Out This note will appear in the output as text in a color which you can set in the document settings under Colors ▷ Greyed-out notes.

This is the text[1] of a comment that appears in the output.

As you can see in the example, greyed out notes can have footnotes.

Notes are inserted with the toolbar button 🗒 or the menu Insert ▷ Note. Right-click on the note box that appears to select the note type.

4.2. Footnotes

L_YX uses boxes to display footnotes: When you insert a footnote using the menu Insert ▷ Footnote or the toolbar button 📄, you will see a box like this: `Foot 1` This box is L_YX's representation of your footnote. If you left-click on the "foot" label, the box will be opened and you can enter the footnote text into it. Clicking on the box label again will close the box. If you want to turn existing text into a footnote, simply highlight it and click on the footnote toolbar button.

---

[1]This is an example footnote within a greyed out note. In this document the color of this note type is set to blue.

Here is an example footnote:[2]

The footnote will appear in the output as a superscript number at the text position where the footnote box is placed. The footnote text is placed at the bottom of the current page. The footnote number is calculated by LyX according to the document class. LyX does not yet support a particular numbering scheme, but you can get other schemes using special LaTeX-commands. They are described in the *Embedded Objects* manual.

4.3. Marginal Notes

Marginal notes look and behave just like footnotes in LyX. When you insert a margin note via the menu Insert ▷ Marginal Note or the toolbar button 🗏, you will see a box with the label "margin" appearing within your text. This box is LyX's representation of your marginal note.

This is a
marginal
note.

At the side of this sentence is an example marginal note.

Marginal notes appear at the right side in single-sided documents. In double-sided documents they appear in the outer margin – left on even pages, right on odd pages.

For further information about marginal notes see the section *Margin Notes* in the *Embedded Objects* manual.

4.4. Graphics and Images

To insert an image in your document, place the cursor at the text position you want and click on the toolbar icon 🖼 or select Insert ▷ Graphics from the menu. Then a dialog will appear to choose the file to load.

This dialog has numerous mostly self-explanatory parameters. The Graphics tab allows you to choose your image file. The image can be transformed by setting a rotation angle and a scaling factor. The scaling units are explained in Appendix D.

In the tab Clipping it is possible to set image coordinates to adjust the height and width of the image in the output. The coordinates can also be calculated automatically by pressing the button Get from file. The option Clip to bounding box will only print the image region within the given coordinates. Normally you don't need to take care about image coordinates and can ignore the tab Clipping.

In the LaTeX and LyX options tab LaTeX experts can specify additional LaTeX options. In this tab you can also specify the appearance of the image inside LyX. The option

---

[2]To close a footnote, click on the footnote box label.

Draft mode has the effect that the image doesn't appear in the output, only a frame with the image size is printed.

The graphics dialog can be called at any time by clicking on an image. Images will appear in the output exactly at the position where they are in the text. This is an example image within a separate, horizontally centered paragraph:
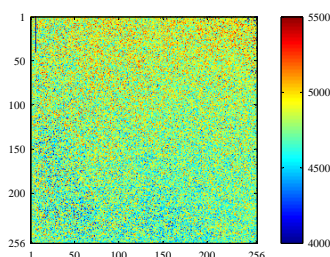
If you need image captions or want to reference images, you have to put the image into a float, see section 4.6.2.

4.4.1. Image Formats

You can insert images in any known file format. But as we explained in section 3.8.2, every output document format allows only a few image formats. LyX therefore uses the program `ImageMagick` in the background to convert the images to the right format. To increase your workflow by avoiding these conversions in the background, use only the image formats listed in the subsections of section 3.8.2.

Similar to fonts there are two types of image formats:

Bitmap images consist of pixel values, often in a compressed form. They are therefore not fully scalable and look pixelated in large zooms. Well-known bitmap image formats are "Graphics Interchange Format" (GIF, file extension ".`gif`"), "Portable Network Graphics" (PNG, file extension ".`png`"), and "Joint Photographic Experts Group" (JPG, file extension ".`jpg`" or ".`jpeg`").

Scalable images consist of vectors and can therefore be scaled to any size without data loss. The scaling ability is desired if you want to create presentations, because presentations are always scaled by the beamer. Scaling is also useful for online documents to let the user zoom into diagrams.
Scalable image formats can be "Scalable Vector Graphics" (SVG, file extension ".`svg`"), "Encapsulated PostScript" (EPS, file extension ".`eps`"), and "Portable Document Format" (PDF, file extension ".`pdf`"). We say "can be", because you can convert any bitmap image format to PDF or EPS and the result will not be scalable. In this case only a header with the image properties is added to the original image.[3]

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[3]In the case of PDF, the original image is additionally compressed.

Normally one cannot convert a bitmap image into a scalable one, only *vice versa.*

4.4.2. Grouping of Image Settings

Each image can define a new group of image settings or join an existing group. Images within such a group share their settings, so adjusting one image of the group automatically also adjusts all other images of the group in the same way. So you can for example change the size for a bunch of images without the need to manually change each of them.

A new group can be set by pressing the button Open new group in the Graphics dialog in the LaTeX and LyX options tab. Joining an existing group can be done using the context menu of the image and checking the name of the desired group.

4.5. Tables

You can insert a table using either the toolbar button ▤ or the menu Insert ▷ Table. A dialog will appear, asking you for the number of rows and columns, and you can select a specific (border) style. The default table has lines around any cell and the first row appears separated from the rest of the table. This separation appears due to a double line: The cells of the first row have a line below them and the cells of the second row have a line above them. Here is an example table:

	1	2	3
A			
B			
C			

This corresponds to the "Grid with Head" table style listed in the style selection.

Other available styles include:

- A "simple grid" which looks line the above table, but without the first row being separated via double line,

- a border-less table with no lines at all,

- and a so-called "formal table" as often used in professional publishing with horizontal lines only and bold top/bottom lines (see *Embedded Objects* manual, section *Formal Tables*). It is also possible to have an horizontal (thin) Footline above the last line.

The default style used in the dialog as well as the style used by the toolbar button can be changed in Document ▷ Settings ▷ Text Layout. So if the default style above is not the one you need, you should alter this setting.

4.5.1. Table Dialog

You can alter a table by clicking on it with the right mouse button and then choosing More ▷ Settings. This brings up the table dialog. Here you can adjust the settings of the cell, row and/or column where the cursor is placed currently. Most of the dialog options also work on selections. This means that if you select more cells, columns or rows the action is done on all of your selection.

In addition to the table dialog, the table toolbar helps you in setting table properties. It appears if the cursor is inside a table.

In the tab Table Settings of the table dialog you can set the alignment for the current row. If you add a row or column, it will be inserted right beside or below the current cell respectively. The vertical alignment of a column can only be adjusted when a column width is given. A given width will allow the cell to have line breaks and multiple paragraphs of text, see section 4.5.3.

You can mark multiple cells of one row/column as a multicolumn/row cell using the check box Multicolumn or Multirow. This will merge the cells to *one* cell, spread over more than one column/row. Multicolumn cells are treated as own rows, so that the alignment, width, and border settings affect only the multicolumn cell. Here is an example table with a multicolumn cell in the first row and one in the last row without the upper border:

abc	def ghi	jkl
A	B	C	D
1	2	3	4

Adept users can declare special LaTeX-arguments for the table. They are necessary for special table formatting, such as the multirow cells, explained in the chapter *Tables* of the *Embedded Objects* manual. You can also rotate the current cell or the whole table. These rotations are not visible in LyX but are visible in the output.

Note: Most DVI-viewers are *not* able to display rotations.

The Borders tab allows you to add and delete border lines for the current row/column. The button Default adds lines for all cell borders.

4.5.2. Multi-page Tables

If the table is too long to fit on one page, you can use the option Use multi-page table in the tab Multi-page table of the table dialog to split the table automatically over more pages. Doing this enables some check boxes and you can now define:

Header: The current row and all rows above, that don't have any special options defined, are defined to be the header rows of all pages of the longtable. Except for the first page, if First header is defined.

First header: The current row and all rows above, that don't have any special options defined, are defined to be the header rows of the first page of the longtable.

Footer: The current row and all rows below, that don't have any special options defined, are defined to be the footer rows of all pages of the longtable, except for the last page, if Last footer is defined.

Last footer: The current row and all rows below, that don't have any special options defined, are defined to be the footer rows of the last page of the longtable.

Caption: The first row is reset as a single column. You can now insert there the table caption via the menu Insert ▷ Caption. More about multi-page table captions can be found in the *Embedded Objects* manual.

You can also specify a row where the table is split. If you set more than one option in the same table row, you should be aware that then only the first option is used; the others will be defined as *empty*. In this context, first means first in this order: Footer, Last footer, Header, First header; see the following longtable to see how it works:

Example Phone List (ignore the names)		
NAME		TEL.
Annovi	Silvia	111
Bertoli	Stefano	111
Bozzi	Walter	111
Cachia	Maria	111
Cachia	Maurizio	111
Cinquemani	Giusi	111
Colin	Bernard	111
Concli	Gianfranco	111
Dal Bosco	Carolina	111
Dalpiaz	Annamaria	111
Feliciello	Domenico	111
Focarelli	Paola	111
Galletti	Oreste	111
Gasparini	Franca	111
Rizzardi	Paola	111
Lassini	Giancarlo	111
Malfatti	Luciano	111
Malfatti	Valeriano	111
Meneguzzo	Roberto	111
Mezzadra	Roberto	111
continue ...		

Example Phone List		
NAME		TEL.
Pirpamer	Erich	111
Pochiesa	Paolo	111, 222
Radina	Claudio	111
Stuffer	Oskar	111
Tacchelli	Ugo	111
Tezzele	Margit	111
Unterkalmsteiner	Frieda	111
Vieider	Hilde	111
Vigna	Jürgen	111
Weber	Maurizio	111
Winkler	Franz	111
Annovi	Silvia	555
Bertoli	Stefano	555
Bozzi	Walter	555
Cachia	Maria	555
Cachia	Maurizio	555
Cinquemani	Giusi	555
Colin	Bernard	555
Concli	Gianfranco	555
Dal Bosco	Carolina	555
Dalpiaz	Annamaria	555
Feliciello	Domenico	555
Focarelli	Paola	555
Galletti	Oreste	555
Gasparini	Franca	555
Rizzardi	Paola	555
Lassini	Giancarlo	555
Malfatti	Luciano	555
Malfatti	Valeriano	555
Meneguzzo	Roberto	555
Mezzadra	Roberto	555
Pirpamer	Erich	555
Pochiesa	Paolo	555, 222
continue ...		

Example Phone List		
NAME		TEL.
Radina	Claudio	555
Stuffer	Oskar	555
Tacchelli	Ugo	555
Tezzele	Margit	555
Unterkalmsteiner	Frieda	555
Vieider	Hilde	555
Vigna	Jürgen	999
Weber	Maurizio	555
Winkler	Franz	555
End		

4.5.3. Table Cells

A table cell can contain text, inline equations, a figure, or another table. All these kinds of objects can be placed in the same cell. Font sizes and shapes can also be altered. But you can't put a special environment in a cell (like **Section***, etc.), nor set spacing options for the cell's paragraph.

To have multi-line entries in table cells, you have to declare a fixed width for the column in the table dialog. Your text is then automatically split into multiple lines and the cell is enlarged vertically when the length of the text exceeds the given width. An example:

1	2	3
4	This is a multi-line entry in a table.	5
6	This is longer now.	7
8	This is a multi-line entry in a table. This is longer now.	9

Cutting and pasting between tables and table cells works reasonably well. You can even cut and paste more than one row.[4] Selection with the mouse or with **Shift** plus

---

[4]Note that you cannot paste into a multicell selection because it would not be clear what to do

the arrow keys works as usual. You can also copy and paste the entire table as a single unit by starting the selection from outside the table.

4.6. Floats

4.6.1. Introduction

A float is a block of text associated with some sort of label, which doesn't have a fixed location. It can "float" forward or backward a page or two, to wherever it fits best. Footnotes and Margin Notes are also floats, because they can float to the next page when there are too many notes on the current page.

Floats make it possible to get a high quality layout. Images and tables can be distributed evenly over the pages to avoid whitespace and pages without text. As the floating often destroys the spatial context between the text and the image/table, every float can be referenced in the text. Floats are therefore numbered. Referencing is described in section 6.1.

To insert a float, use the menu Insert ▷ Float. A box with a caption will be inserted into your document. The label will automatically be translated to the document language in the output. After the label you can insert the caption text. The image or table is inserted above or below the caption in a separate paragraph within the float. To keep your LyX-document readable, you can open and close the float box by left-clicking on the box label. A closed float box looks like this: float: Figure – a gray button with a red label.

You should insert floats in a separate paragraph to avoid possible LATEX-errors that can occur when the surrounding text is specially formatted.

4.6.2. Figure Floats

Figure 4.1 was created using the menu Insert ▷ Float ▷ Figure (toolbar button). The image was inserted by setting the cursor above the caption label and using the menu Insert ▷ Graphics (toolbar button). The image in the float was horizontally centered by putting the cursor to the left or right of the image and using the menu Edit ▷ Paragraph Settings (toolbar button).

This figure float also shows how to set a label and create a cross-reference to it: Insert a label into the caption using the menu Insert ▷ Label (toolbar button) and refer to it using the menu Insert ▷ Cross-Reference (toolbar button). It is important to use cross-references to figure floats rather than using vague references like "the figure above", because, as LATEX will reposition the floats in the final document, it might not be "above" at all. For more about cross-references, see section 6.1.
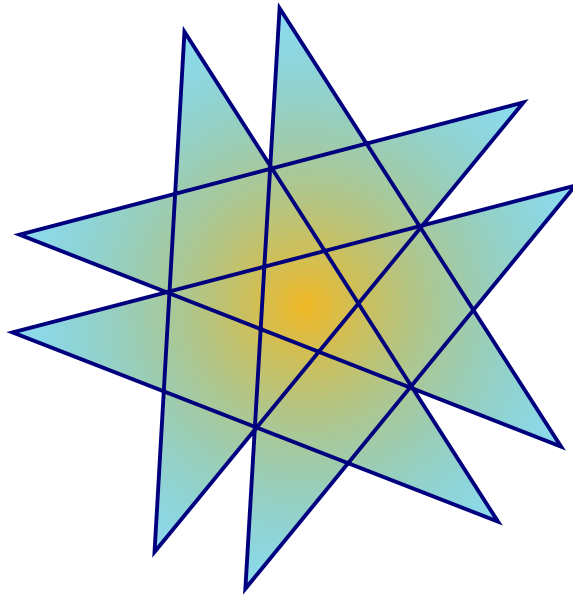
---

when pasting a single word in a selected 2×3.

Figure 4.1.: A star in a float.

Table 4.2.: A table float.

1	2	3
Joe	Mary	Ted
$\int x^2 dx$	$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$	$1 + 1 = 2$

Normally only one image is inserted in a figure float, but sometimes you might want to use two images with separate subcaptions. This can be done by inserting image floats into existing image floats. Note that only the main caption of the float is added to the List of Figures as described in section 6.2.2. Figure 4.2 is an example of a figure float with two images set side by side. You can also set the images one below the other. Figure 4.2a and 4.2b are the subfigures.

4.6.3. Table Floats

Table floats can be inserted using the menu Insert ▷ Float ▷ Table or the toolbar button ⊞. They have the same properties as figure floats except that the table in the float is normally placed below the caption and not above like for figures and that the label begins with "tab:". Table 4.2 is a table float.

(a) Undefinable   (b) Star
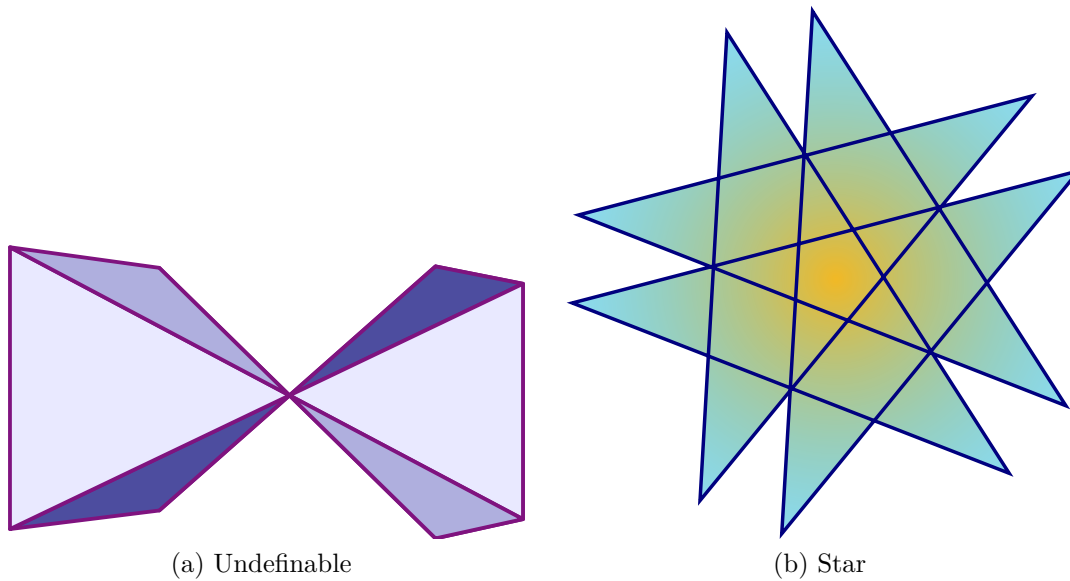
Figure 4.2.: Two images.

4.6.4. More Information

LyX offers you further float types as well as rotated floats. It also allows you to change the float numbering scheme, to control the float placement and to change the formatting and placement of the float caption. All these features are explained in detail with many examples in the chapter *Floats* in the *Embedded Objects* manual.

4.7. Minipages

LaTeX provides a mechanism essentially to produce a page within a page, called a minipage. Within a minipage, all the usual rules of indentation, line wrapping, etc. apply.

Minipages in LyX have their own collapsible box inserted via the menu Insert ▷ Box. Right-clicking on the box label allows you to alter the width of the minipage and its alignment within the page.

> *This is a minipage. The text is set in an italic style.*
> *Minipages are often used for text in another language or text that needs another formatting.*

If you place two minipages side-by-side, you can use Horizontal Fills as described in

section 3.5.2:

This is a minipage
with some stupid
dummy text. This
dummy text is used
to increase the size
of the minipage.

This is a minipage
with some stupid
dummy text. This
dummy text is used
to increase the size
of the minipage.

When you right-click on a minipage box, you can transform the box to another box
type. All box types and their settings are explained in detail in chapter *Boxes* of the
Embedded Objects manual.

5. Mathematical Formulas

The issues of this chapter are described in detail in the *Math* manual. There you will also find tips and tricks for special cases.

5.1. Basic Math Editing

To create a math formula, you can just click on the toolbar icon Σ (shortcut Ctrl+M). That will create a little blue rectangle, with purple markers around its corners. That blue rectangle is the formula itself; the purple markers indicate what level of nesting within the formula you are at. You can also choose a particular formula type to insert via the Insert ▷ Math menu.

Editing the parameters of a formula and adding math constructs can be done with the math toolbar, that appears if the cursor is in a formula.

There are two main types of formulas, inline formulas and display formulas. Inline formulas appear within a text line, like this one:

This is a line with an inline formula $A = B$ in it.

Displayed formulas appear outside the text like if they were in a separate paragraph, like this one:
$$A = B$$

You can only number and reference displayed formulas.

LyX also supports many LaTeX math commands. For example, typing "**\alpha**", followed by a space, in a formula will create the Greek letter α. Typing commands might sometimes be faster than using the Math Panel.

5.1.1. Navigating in Formulas

The best control over the cursor position within an existing formula is achieved with the arrow keys. LyX uses small rectangles to indicate places where something can be inserted. The arrow keys can be used to navigate between parts of a formula. Pressing Space will leave a formula construct (a square root $\sqrt{2}$, or parentheses (f), or a matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$). Pressing Escape will leave the formula, placing the cursor after

the formula. Tab can be used to move horizontally in a formula; for example, through the cells of a matrix or the positions in a multi-line equation.

Space, printed in this document as "␣", seems to do nothing in a formula, since it does not add a space between characters, but it does exit a nested structure. For this reason, you have to be careful about using Space. For example, if you want $\sqrt{2x + 1}$, type **\sqrt␣2x+1** and not **\sqrt␣2x␣+1**, since in the latter case only the $2x$ will be under the square root sign: $\sqrt{2x} + 1$.

You can leave many parts of a formula, like this matrix, partially filled in, such as:

$$\begin{pmatrix} \lambda_1 & & \\ & \ddots & \\ & & \lambda_n \end{pmatrix}$$

If you leave a fraction only partially filled in, or a subscript with nothing in it, the results will be unpredictable, but most constructs don't mind.

5.1.2. Selecting Text

You can select text within a formula in two different ways. Place the cursor at one end of the string of text you want, and press Shift and a cursor movement key to select text. It will be highlighted as with regular text selection. Alternatively, you can select text with the mouse in the usual way. That text can then be cut or copied, and then pasted within any formula, but not in a normal text region in LyX.

5.1.3. Exponents and Subscripts

You can use the math panel to add super- or subscripts (buttons $\Box^\Box$ and $\Box_\Box$), but it is often much easier to use a command. To get x^2, type in a formula **x^2␣**. The final Space puts the cursor back down on the base line of the expression. If you type **x^2y**, you will get x^{2y}, to get $x^2 y$, type **x^2␣y**. If you use characters in the superscript, that could be accented with the circumflex "^", you have to use an extra Space to separate the circumflex and the character. For example, if you want x^a, type **x^␣a**. Subscripts are similar: To get a_1, type **a_1␣**.

5.1.4. Fractions

Create a fraction either with the command **\frac** or by using the icon $\frac{a}{b}$ in the Math Panel. You will be presented with an empty fraction. The cursor is above the fraction line. To move it to the bottom, simply press Down. To move back up, press

Up. Any math structure can be placed in a fraction, as this example shows:

$$\left[\frac{1}{\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}} \right]$$

5.1.5. Roots

Roots can be created using the Math Panel buttons $\sqrt{}$ or $\sqrt[]{}$ or the commands **\sqrt** or **\root**. With the command **\root** you can produce roots of higher orders, like cube roots, while **\sqrt** always produces a square root.

5.1.6. Operators with Limits

Sum ($\sum$) and integral ($\int$) operators are very often decorated with limits. These limits can be entered in L_YX by entering them as you would enter a super- or subscript, directly after the symbol. The sum operator will automatically place its "limits" over and under the symbol in displayed formulas, and to the side in inline formulas, as in $\sum_{n=0}^{\infty} \frac{1}{n!} = e$, versus

$$\sum_{n=0}^{\infty} \frac{1}{n!} = e$$

Integral signs, however, will place the limits to the side in both formula types.

All operators with limits will be automatically re-sized when placed in display mode. The placement of the limits can be changed by placing the cursor directly behind the operator and using the menu Edit ▷ Math ▷ Change Limits Type or entering Alt+M L.

Certain other mathematical expressions also have this "moving limits" feature, such as

$$\lim_{x \to \infty} f(x),$$

which will place the $x \to \infty$ underneath the "lim" in display mode. In inline formulas it looks like this: $\lim_{x \to \infty} f(x)$.

Note that the lim-function was entered as the function macro **\lim**. Have a look at section 5.1.9 for an explanation of function macros.

5.1.7. Math Symbols

Most math symbols can be found in the Math Panel under one of several categories; including Greek, Operators, Relations, Arrows. There are also the additional symbols provided by the American Mathematical Society (AMS).

If you know the LaTeX-command for a construct or symbol you wish to use, you don't have to use the **Math Panel**; you can type the command directly into the formula. LyX will convert it to the corresponding symbol or construct.

5.1.8. Altering Spacing

You may want to create spaces that differ from the standard spacing that LaTeX provides. To do this, press **Ctrl+Espace** or use the **Math Panel** button ↤. This generates a small space, and shows a small marker on the screen. For example, the sequence **a Ctrl+Space b**: $a\,b$ appears in LyX as $a\llcorner b$. You can change the space to different sizes when you set the cursor behind the space marker and enter space again several times. With every space enter the size will be changed. Some markers for the space size appear red in LyX, because they are negative spaces. Here are two examples:

a Ctrl+Space b and $3\times$**Space**: $a\quad b$

a Ctrl+Space b and $5\times$**Space**: $\!ab$

5.1.9. Functions

The **Math Panel** contains under the button $^{\text{exp}}_{\text{tan}}$ a number of function macros, such as sin, lim, *etc.* (you can also insert them in a formula by typing **\sin** etc.). Standard mathematical practice is that functions are printed upright to avoid confusions, because sin does normally mean $s \cdot i \cdot n$.

Using the function macros will also produce correct spacing around the function: $a \sin x$ is different from $asinx$.

For some mathematical objects, like limits, the macro changes where subscripts are placed, as described in section 5.1.6.

5.1.10. Accents

In a formula you can insert accented characters in the same way as in text mode. This may depend on your keyboard, or the bindings file you use. You can also use LaTeX commands, for example, to enter $\hat{a}$ even if your keyboard doesn't have the circumflex enabled. Our example is entered by typing **\hat␣a** in a formula. Table 5.1 shows the equivalences between the accent names and the commands.

You can choose one of the accents by selecting an item from the **Frame decorations** symbol set button ⌢̂ in the math panel; this will apply to any selection you have made within a formula too.

Table 5.1.: Accent names and the corresponding commands.

Name	Command	Example
circumflex	**\hat**	$\hat{a}$
grave	**\grave**	$\grave{a}$
acute	**\acute**	$\acute{a}$
umlaut	**\ddot**	$\ddot{a}$
tilde	**\tilde**	$\tilde{a}$
dot	**\dot**	$\dot{a}$
breve	**\breve**	$\breve{a}$
caron	**\check**	$\check{a}$
macron	**\bar**	$\bar{a}$
vector	**\vec**	$\vec{a}$

5.2. Brackets and Delimiters

There are several brackets available through LyX. For some purposes, using just the keys `[]{}()|<>` should suffice. But if you want to surround a large structure, like a matrix or a fraction, or if you have several layers of brackets, it is better to use the math toolbar delimiter icon [ ]. For example, if you construct the brackets around a matrix in this way:

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

it makes it easier to see the layers of parentheses. Below, the expression on the left was entered using the delimiter icon [ ] and the expression on the right was entered using the `()` keys.

$$\frac{1}{\left(1 + \left(\frac{1}{1+\left(\frac{1}{1+x}\right)}\right)\right)} \qquad \frac{1}{(1 + (\frac{1}{1+(\frac{1}{1+x})}))}$$

If you use the delimiter icon, the parentheses, and other brackets from that menu will automatically re-size to accommodate the size of what is inside.

To construct brackets click on the button for the bracket you want on the left side and right side. If you use the option Keep matched, the selected bracket type will be used for the left and the right side. The selection will be shown as TEX code. If you want one side not to have a bracket, use (none). It will appear in LyX with a dotted line, but nothing will be printed.

If you want to place brackets around existing math structures, like a square root, you can do so by first highlighting (selecting) the structure that is to go inside the

brackets. Then choose the appropriate brackets for left and right and click on Insert. The most common bracket combinations (parentheses, square brackets, and braces, on both sides) can be entered more quickly using keyboard shortcuts. For example, to insert a pair of parentheses, select the structure and enter Alt+M (.

5.3. Arrays and Multi-line Equations

Matrices are entered in LyX using the Math Panel matrix button ▦. It will open a dialog for you to choose the number of rows/columns. Here is an example:

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

The parentheses aren't automatic, but you can add them as described in section 5.2. When you construct the matrix, you can decide whether the column entries will be left-, right-, or center-justified. This alignment is set in the box Horizontal with the letters "l", "r", and "c". LyX proposes a "c" for every column as default. For example, the sequence "lcr" means that the first column will be left-justified, the second will be centered, and the third column will be right-justified, because each letter corresponds to the relevant column. The result will look like this:

$$\begin{array}{lcr} this & this\,column & this\,column \\ column & has & has\,right \\ has\,left\,alignment & center\,alignment & alignment \end{array} .$$

You can add more rows to an existing matrix by entering Ctrl+Retour while the cursor is in the matrix. Adding or deleting columns can be done via the menu Edit ▷ Math or the math toolbar.

There are other arrays used in formulas, such as distinctions of cases. It can be created with the menu Insert ▷ Math ▷ Cases Environment or the command \cases. Here is an example:

$$f(x) = \begin{cases} -1 & x < 0 \\ 0 & x = 0 \\ 1 & x > 0 \end{cases}$$

Multi-line formulas are created when you press Ctrl+Retour within a formula. In an empty formula you can see that three blue boxes appear, one for each column. When you press Ctrl+Retour in a non-empty formula, the part before the relation sign (equal sign "=" etc.) will be inserted automatically in the first column, the relation sign is in

the second column, and the rest in the third column. A new row is created by every further entry of **Ctrl+Retour**. Multi-line formulas are always displayed formulas. Here is an example:

$$
\begin{array}{rcl}
a^2 & = & (b^2 + c^2)(b^2 - c^2) \\
a & = & \sqrt{b^4 - c^4}
\end{array}
\tag{5.1}
$$

Note that the middle column is designed for relation signs so structures in this column will be printed in a smaller size:

$$
\frac{A}{B} \quad \frac{A}{B} \quad \frac{A}{B}
$$

The multi-line formula type described here is called `eqnarray`. There are other multi-line types more suitable for certain situations, for example if you want a better inter-line spacing than in formula (5.1). The other types are described in section 5.7.2.

5.4. Formula Numbering and Referencing

To number a formula, set the cursor in the formula and use the menu **Edit ▷ Math ▷ Number Whole Formula** or the shortcut **Alt+M N**. The formula number appears in LyX within parentheses. The number shown is temporary and may be different when the output is generated. The placement and format of the formula number in the output depends on the document class. In this document the number is printed together with the chapter number, separated by a dot:

$$
1 + 1 = 2
\tag{5.2}
$$

Using **Alt+M N** in a numbered formula will switch off the numbering. You can only number displayed formulas.

Multi-line formulas can be numbered line by line: Using the menu **Edit ▷ Math ▷ Number This Line** or the shortcut **Alt+M Maj+N** will only toggle the numbering of the line where the cursor is:

$$
\begin{array}{rcl}
1 & = & 3 - 2 \\
2 & = & 4 - 2 \\
4 & \leq & 7
\end{array}
\tag{5.3}
$$
$$
\tag{5.4}
$$

To number all lines use the shortcut **Alt+M N**.

Every displayed formula can be referenced by its number using a label. A label is inserted with the menu **Insert ▷ Label** (toolbar button ✎) when the cursor is in the formula. This opens a dialog to enter the label. It is recommended that you use the

suggested "eq:" as the first part of the label, because this helps later to identify the label type when you have many labels in your document. We inserted in the following example the label "eq:tanhExp" in the second line:

$$\begin{aligned} \tanh(x) &= \frac{\sinh(x)}{\cosh(x)} \\ &= \frac{e^{2x} - 1}{e^{2x} + 1} \end{aligned} \tag{5.5}$$

Every labeled line is automatically numbered. Therefore the label is shown behind the formula number. You can reference a labeled formula using the menu Insert ▷ Cross Reference (toolbar button ⇶). A dialog appears to choose a label you want to refer to. The reference appears in LyX as a gray cross-reference box and in the output as the formula number:

This is a cross-reference to equation (5.5).

The properties of LyX's cross-reference box are described in section 6.1. To delete a label, set the cursor at the end in the labeled formula and press Del.

5.5. User defined math macros

LyX allows you to define macros for formulas which is very useful when you have equations of the same form in a document several times. Math macros are explained in section *Math Macros* of the *Math* manual.

5.6. Fine-Tuning

5.6.1. Typefaces

The standard font for text is italic, for numbers the standard is roman. To set a font in a formula, use the Math Panel button A𝒜, or enter its command, listed in table 5.2, directly.

Note: You can only print capital letters in the typefaces Blackboard, Double stroke, Script and Calligraphic.

When you use a typeface, a blue box is inserted in the formula. Every character in this box will be printed in this typeface. Pressing Space within the box will set the cursor outside, so that you have to use a non-breaking space when you need a space in the box. Here is an example where "N" in Blackboard denotes the set of numbers:

$$f(x) = \sqrt{x} \, ; \, x \in \mathbb{N}$$

Table 5.2.: Typefaces and the corresponding commands.

Font	Command
Roman	**\mathrm**
Bold	**\mathbf**
Italic	**\mathit**
Typewriter	**\mathtt**
𝔹𝕃𝔸ℂ𝕂𝔹𝕆𝔸ℝ𝔻	**\mathbb**
𝔻𝕆𝕌𝔹𝕃𝔼𝕊𝕋ℝ𝕆𝕂𝔼	**\mathds**
𝔉𝔯𝔞𝔨𝔱𝔲𝔯	**\mathfrak**
𝒞𝒜ℒℒℐ𝒢ℛ𝒜𝒫ℋℐ𝒞	**\mathcal**
𝒮𝒞ℛℐ𝒫𝒯	**\mathscr**
SansSerif	**\mathsf**

The typefaces are nestable, which can cause confusion. You can, for example, put a character in Fraktur in a box for Typewriter: abcðe

So it is better not to use this feature.

The typefaces have no effect on Greek letters: 𝔞𝔟𝔠δε

You can only print them emboldened using the command **\boldsymbol**, which works like the other typeface commands: $\alpha\beta\gamma\boldsymbol{\alpha\beta\gamma}$

\boldsymbol works for all symbols, letters, and numbers.

A number of other font options are available as well, in the menu Edit ▷ Math ▷ Text Style.

5.6.2. Math Text

Typefaces are useful for entering some characters in some given font, but not for text. For typing longer pieces of text use the math text, which is obtained using the entry Normal text mode of the Math Panel button AA. Math text appears in LYX in black instead of blue. You can use spaces and accents in math text as in normal text. Here is an example:

$$f(x) = \begin{cases} x & \text{if I say so} \\ -x & \text{under Umständen} \end{cases}$$

5.6.3. Font Sizes

There are four font styles (relative sizes) used in math-mode, which are automatically chosen in most situations. These are called textstyle, displaystyle, scriptstyle, and scriptscriptstyle. For most characters, textstyle and displaystyle are actually the

same size, but fractions, superscripts and subscripts, and certain other structures, are set larger in displaystyle. Except for some operators, which resize themselves to accommodate various situations, all text will be set in the styles that LATEX thinks are appropriate. These choices can be overridden by using the math panel button $\Sigma_{\square}^{\square}$. A box for the size will be created in which you can insert the math structure. For example, you can set $\frac{1}{2}$, which is normally in textstyle, larger in displaystyle: $\dfrac{1}{2}$. The four styles are used in the following example:

$$displaystyle, \ textstyle, \ scriptstyle, \ scriptscriptstyle.$$

All these math-mode font sizes are relative so that if the whole math inset is set in a particular size with the menu Edit ▷ Text Style, all sizes in the formula will be adjusted relative to this size. Similarly, if the base font size of the document is changed, all fonts will be adjusted to correspond. As an example here is a formula in the font size "largest":

$$\mathrm{e} = \Sigma_{n=0}^{\infty} \frac{1}{n!}$$

5.7. AMS-LATEX

LYX supports the packages provided by the American Mathematical Society (AMS) that are in common use.

5.7.1. Enabling AMS-Support

You can make the facilities of the AMS-packages explicitly available in the document by setting Load always for **amsmath** and **amssymb** packages in the Document ▷ Settings dialog under Math Options. AMS is needed for many math-constructs; so when you get LATEX-errors in formulas, ensure that you have enabled AMS.

5.7.2. AMS-Formula Types

AMS-LATEX provides a selection of different formula types. LYX allows you to choose between `align`, `alignat`, `flalign`, `gather`, and `multline`. We refer you to the AMS-documentation, [15], for an explanation of these formula types.

6. More Tools

6.1. Cross-References

One of LyX's strengths is cross-references. You can reference every section, float, footnote, formula, and list in the document. To reference a document part, you have to insert a label into it. The label is used as an anchor and a name for the reference. We want for example to refer to the second item of the following list:

1. First item

2. Second item

3. Third item

First we insert a label into the second item with the menu Insert ▷ Label or by pressing the toolbar button ✎. A gray label box like this: enu:Second-item is inserted and the label window pops up asking for the label text. LyX offers as text the first words of the item with a prefix, in our case the text "enu:Second-item". The prefix "enu:" stands for "enumerate". The prefix depends on the document part where the label is inserted; for example, if you insert a label into a section heading, the suggested prefix will be "sec:".

To reference the item, we refer to its label using the menu Insert ▷ Cross-Reference or the toolbar button ⇥. A gray cross-reference box like this: Ref: enu:Second-item is inserted and the cross-reference window appears showing all the labels in the document. We can now sort the labels alphabetically and then choose the entry "enu:Second-item". At the position of the cross-reference box the item number will appear in the output.

As an alternative to Insert ▷ Cross-Reference, you can right-click on a label and in the popup menu select Copy as Reference. The cross-reference to this label is now in the clipboard and can be pasted to the actual cursor position via the menu Edit ▷ Paste (shortcut Ctrl+V).

Here is our cross-reference: Item 2

It is recommended to use a non-breaking space[1] between the cross-reference name and the cross-reference to avoid ugly line breaks between them.

---

[1]described in section 3.5.1

There are eight formats of cross-references:

<reference>: prints the number, this is the default: 4.2

(<reference>): prints the number within two parentheses, this is the style normally used to reference formulas, especially when the reference name "Equation" is omitted: (5.5)

<page>: prints the page number: Page 85

on page <page>: prints the text "on page" and the page number: on page 85
If the label is on the same page, it prints "on this page"; if the label is on a facing page in a two-sided document, it prints "on the facing page"; if it is on the previous page which is not a facing page, it prints "on the previous page"; if it is on the next page which is not a facing page, it prints "on the next page". The wording of the printed text also depends on the used document class.

<reference> on page <page>: prints the number, the text "on page" and the page number: 4.2 on page 85
If the label is on the same page, this format behaves like **<reference>**; otherwise it behaves like **on page <page>**.

Formatted reference: prints a self defined cross-reference format.
Note: This feature is only available when you have the LaTeX-package **prettyref** or **refstyle** installed.
You can select which LaTeX-package should be used for this feature by setting the option Use refstyle (not prettyref) for cross-references in the menu Document ▷ Settings ▷ Document Class. The package **refstyle** is the default and preferred because **prettyref** supports only English documents. The format is specified by using the command **\newrefformat** (prettyref) or **\newref** (refstyle) in the LaTeX preamble of the document. For example redefining all references to figures (which have the label shortcut "fig") can be done for **refstyle** with this command:
\newref{fig}{refcmd={Image on page \pageref{#1}}}
Note that neither **prettyref** nor **refstyle** predefines reference formats for all available types. This is especially true for the wide variety of mathematical 'theorem' environments. So if you want to make formatted references to, say, Propositions, then you will need to define the relevant format yourself. For **prettyref**, you might do so as follows:
\newrefformat{prop}{Proposition \ref{#1}}
For more information about defining formatted references, have a look at the package documentation [22, 23].
The options Plural and Capitalized will be available with formatted references only if you are using the **refstyle** package.
If you activate the option Format cross-references in work area, LyX will attempt to display the formatted reference as it would appear in output, e.g., as "Theorem 1", rather than just displaying the label.

Textual reference: prints the caption or the name of the reference: Two images.

Label only: prints only the LaTeX label for the reference: fig:Two-images
This allows for customization, using TeX Code, if you want to issue a command that LyX does not support. If you are using **refstyle**, then you may want to use the No Prefix option, which will output only the part of the reference following the ":" separator. This is the form needed for e. g. **refstyle**'s range commands.The number and current page of the referenced document part in the output is automatically calculated by LaTeX. The varieties are adjusted in the field Format of the cross-reference window, that appears when you click on the cross-reference.

You can only use the style <reference> to reference numbered document parts, while the reference style <page> is always possible.

If you want to reference a section, put the label in the section heading; for floats put the label in the caption; for footnotes put the label in it. Referencing formulas is explained in section 5.4.

Right-clicking on a cross-reference opens a context menu. The entry Go to Label sets the cursor before the referenced label (Ctrl-clicking on a cross-reference will also take you to its corresponding label). This entry will be renamed in the context menu of the label to Go Back so that you can use it to set the cursor back to the cross-reference. You can also go back with the toolbar button ⇐ or, using the menu: Navigate ▷ Bookmarks ▷ Navigate Back.

You can change labels at any time. References to the changed label will automatically be updated so that you do not need to change them all manually.

If a cross-reference refers to a non-existent label, you will see in LyX "BROKEN" in the cross-reference label and two question marks in the output instead of the reference.

References are described in detail in the section *Referencing Floats* of the *Embedded Objects* manual.

6.2. Table of Contents and other Listings

6.2.1. Table of Contents

The Table of Contents (TOC) is inserted with the menu Insert ▷ List/Contents/References ▷ Table of Contents. It is displayed in LyX as a gray box. If you click on it, the Outline window appears, showing you the TOC entries as outline, which allows you to move and rearrange sections in your documents. So this operation is an alternative to the menu View ▷ Outline Pane that is described in section 2.6.1.

The TOC in the document output lists every numbered section automatically. If you have declared a short title for a section heading, as described in section 3.3.4.4, it will be used in the TOC instead of the section heading. Section 3.3.4.3 describes how the level is adjusted that defines which section types are listed in the TOC. Unnumbered sections are not listed in the TOC.

6.2.2. List of Figures, Tables, Listings and Algorithms

Table, figure, listings and algorithm lists are very much like the table of contents. You can insert them via the Insert ▷ List/Contents/References submenus. The list entries are the float captions and the float number.

6.3. URLs and Hyperlinks

6.3.1. URLs

Links to web pages or email addresses can be inserted via the menu Insert ▷ URL.

Here is an example URL: LyX's homepage: https://www.lyx.org

By default, the URL text will always be in the style `Typewriter`. You can globally change the formatting by putting to Document ▷ Settings ▷ LaTeX Preamble:

> `\urlstyle{<xx>}`

where `<xx>` is either `rm` (Roman), `sf` (Sans Serif), `tt` (Typewriter), or `same` (use whatever the current text font is). To have italicized URLs, use this instead:

> `\def\UrlFont{\rmfamily\itshape}`

URLs will break between lines at certain characters, namely:

> `. @ \ / ! _ | ; > ] % ) , ? & ' + = #`

It does not break at a hyphen (`-`) by default, but you can change that by adding hyphens to Document ▷ Settings ▷ Document Class ▷ Class Options ▷ Custom. If this still does not break URLs suitably to you, a last resort is to put `\usepackage{xurl}` to Document ▷ Settings ▷ LaTeX Preamble; this will cause URLs to be broken at every character.

Note: URLs must not end with a backslash, otherwise you get LaTeX errors.

6.3.2. Hyperlinks

Hyperlinks can be inserted with the menu Insert ▷ Hyperlink or with the toolbar button 🔗. The appearing dialog has two fields: Target and Name. The name is the printed

text for the hyperlink. The hyperlink type can be a weblink like this: LyX's homepage, an Email address like this: lyx-docs mailing list, a link to a file or any other valid URI (such as tel:<phone no.>). The option Literal in the hyperlink settings dialog allows to input TeX code to the Name field.

You can start applications via a hyperlink when you insert a weblink by adding the prefix "run:" to the link target, but note that most PDF viewers disable such links for security reasons.

Hyperlinks will automatically be hyphenated if necessary in the PDF output, and become clickable in the DVI and PDF-output. To set the format of the link text, highlight the hyperlink inset and use the text style dialog. This is for example a hyperlink with bold sans serif text: **LyX's homepage**

The link text color can be changed, when the option Color links is set in the PDF Properties dialog (menu Document ▷ Settings ▷ PDF Properties). The link text is for example set in this document to blue by adding the option
urlcolor=blue
to the field Additional options in the PDF Properties dialog.

To open the link while editing in LyX you can use context menu (or directly via Ctrl + right mouse button click).

6.4. Counters

One powerful feature of LaTeX is its ability to manage counters. Mostly, this is handled automatically, but there are times one wants to modify counters directly. This can be done in LyX using the counter inset, which is accessible from the Edit menu. This allows one to set a counter's value; to reset it (to zero);[2] to add to the value (or subtract from it, since the value added can be negative); to save it; to restore the saved value; and to print the value. These effects can also be limited to LyX itself. And they will appear in HTML and DocBook output, as well as in LaTeX.

There are five commands you can use:

1. Set counter: Allows you to assign a specific value to a counter

2. Increase counter: Allows you to add some specified amount to a counter (or to subtract, if you choose a negative number)

3. Reset to zero: Sets the value of the counter to 0.

4. Save value of counter: Saves the value of the counter so that it can later be restored.

---

[2]Note that the section counter, e.g., starts with its value at zero and then is incremented to one when the first section is created. So, if you want the next section to be section five, say, then you need to set the section counter to four.

5. **Restore value of counter**: Restores the previously saved value.

The dialog allows you to choose which counter you wish to modify from all those that are available in the current document class.

6.5. Appendices

Appendices are created with the menu Document ▷ Start Appendix Here. This menu sets the document from the current cursor position to the end as the appendix part of the book. This part is marked with a red borderline.

Every chapter (or section) within the appendix part is treated as an appendix, numbered with a capital Latin letter. The appendix subsections are numbered with this letter followed by a dot and the subsection number. All appendix sections can be referenced as if they were normal sections, here two examples:

Appendix D; Appendix A.1.15

6.6. Bibliography

There are two ways of generating the bibliography in a LyX document. You can include a bibliography database, which is explained in sec. 6.6.2, or you can insert the bibliography manually, using the paragraph environment Bibliography, which is described in the following section (but see also sec. 3.3.9.2). If you want anything other than the numerical citations that are used in this document, such as author-year citations, and if you have more than a handful of references, then you should seriously consider using a bibliography database.

In order to demonstrate the difference between these two approaches, we use two bibliographies in this document, a Bibliography environment and a database-generated bibliography. As you can see, the bibliography that is created from a database lists only the database entries that are referenced in the document. In other words, the database approach relieves you, amongst other things, from the burden to check which entries you have actually cited.

6.6.1. The Bibliography Environment

Within the Bibliography environment, every paragraph begins with a gray bibliography box labeled with a number. If you click on it, you will get a dialog in which you can set a Key and a Label. The key is the symbolic name by which you will refer to this bibliography entry. Each entry needs to be given a unique key, which is

one word consisting of ASCII characters only.[3] For example, our second entry in the bibliography is a book about LaTeX and we used "latexcompanion", a short form of its title, as the key.

If you set a Label for the entry, references to it will appear with this label instead of the number of the entry. The option Literal in the bibliography items settings dialog allows to input TeX code to the Label field.

You can cross-reference a bibliography entry using the menu Insert ▷ Citation or the toolbar button 📖. A citation reference box is inserted and a citation window will appear containing the available citations. Select one or more keys from the list and Add them. Then press OK. The citation reference box will be labeled with the referenced key(s). If you click on the box, the citation window will appear and you can change the reference.

Citation references appear in the output as the number or the label of the bibliography entry with surrounding brackets. Here are two examples; the first without a label, the second with the label "Credits":

Have a look at the LaTeX Companion Second Edition: [1]

The LyX-Team members are listed in the Credits: [Credits]

You can also produce author-year or author-number citations, using the LaTeX package **natbib**. In order to do so, select Natbib (BibTeX) in the document settings dialog under Bibliography ▷ Style format (see 6.6.2.4). Once you have done that, the Bibliography item settings dialog has three input fields instead of the Label field: Author Names, Year and All Author Names. The first one takes the Author list as it should be displayed in the citation reference, the second the year (without parentheses). These two are madatory. If there are multiple authors and you want to both refer to them as a full list (*Baker, Jones, and Williams*) and in abrreviated form (*Baker et al.*), add the abbreviated form to Author Names and the full list to the optional All Author Names field. If specified like this, you can select between different author-year or author-number styles in the Insert ▷ Citation dialog, and if All Author Names is specified, toggling "All authors" in the citation dialog or the citation context menu will switch between full and abbreviated list. Note that the author and year specified in the dialog are only used for the citation references. In the bibliography entry, author and year must be added manually.

To align all entries in the bibliography environment you can set a longest label via the menu Edit ▷ Paragraph Settings (toolbar button 📄). All entries are then indented in the output by the width of the given label.

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[3]ASCII means this set of characters:
https://en.wikipedia.org/wiki/ASCII#Character_set

6.6.2. Bibliography databases

Bibliography databases are useful if you use the same references in different documents.[4] It also makes it very easy to have a uniform layout for all bibliography entries. You can collect the bibliography of all relevant books and articles of your working field in a database. This database can be used for different documents, and by default only the entries cited in a particular document will appear in the bibliography list for that document. This relieves you of the need to keep track of which articles and books you have cited.

The database is a text file with the file extension ".bib", containing the bibliography in a special format. The format is explained in [8] and in the LaTeX books ([MG04, KD03, Lam94]). The file can be created using any text editor, but normally one uses a special program to create and edit the entries in the database. A list of such programs is maintained on the LyX Wiki at https://wiki.lyx.org/BibTeX/Programs.

LyX supports two different approaches to use bibliography databases in a document. BibTeX is the classic technique that has been the only way to use such databases for a long time. It is quite established and mature and there is a huge range of existing styles available. But it has its drawbacks, especially when it comes to more complex bibliographic needs and support for specific languages and scripts. Those are addressed by **biblatex**. It reads the same database format than BibTeX (although it has been significantly extended beyond BibTeX's scope)[5], but it uses a different framework to generate citations and references from it.

To select if BibTeX or **biblatex** should be used, set in the document settings (menu Document ▷ Settings) under Bibliography the Style format to a BibTeX or a Biblatex format.

6.6.2.1. BibTeX

To access a database via BibTeX, use the menu Insert ▷ List/Contents/References ▷ Bib(la)TeX Bibliography. A window will appear in which you can add one or more databases and select a BibTeX style file. The option Add bibliography to TOC adds a table of contents entry for the bibliography. In the Content drop box you can select whether to include all the entries in the database in the document or just the cited references. The Encoding drop box lets you specify the encoding of the database(s), should this differ from the encoding of the document.

The BibTeX style file is a text file with the file extension ".bst" that controls how the bibliography entries will appear. Your LaTeX distribution should provide several

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[4]They are also useful for keeping a database of articles and notes concerning them. Most of the database programs mentioned below allow you to store annotations and reviews along with bibliographical information.

[5]Meaning: While BIBLATEX can handle any classic BibTeX database, BibTeX might conversely fail to correctly handle databases that use specific BIBLATEX features.

of these, and many publishers provide their own style files, so that you don't have to take care of the layout. It is of course possible to write your own style file, but this is something for experts.[6] In this document we used the BibTeX style alpha.bst, which provides an alpha-numeric style.

Inserting a citation reference works as described in the previous section.

6.6.2.2. Biblatex

Accessing a database via **biblatex** is almost identical to BibTeX: use the menu Insert ▷ List/Contents/References ▷ Bib(la)TeX Bibliography. In contrary to BibTeX you cannot select a style file at this place. The other dialog options are the same as with BibTeX. As for the styles, note the following.

biblatex has two different style files: a bibliography style file (text file with the file extension ".bbx") controls how the bibliography entries will look like and a citation style file (text file with the file extension ".cbx") controls the look of the citation references in the text. Usually such style files come in pairs and it makes sense to use matching styles. It is nevertheless possible to mix any citation style with any bibliography style.

biblatex styles are not set in the Bib(la)TeX Bibliography dialog, but in the document settings. However, in the dialog in the Options field, which is only visible if you use **biblatex**, you can enter options that determine how the bibliography is printed (for example how its heading will appear). These options are described in detail in the **biblatex** manual, [9].

Inserting a citation reference works as described in section 6.6.1.

6.6.2.3. Bibliography Processors

To generate the bibliography from a database, LyX uses a bibliography processor, that is an external program that reads the database, sorts the citations and processes the data in a way it can be included in the document. The classic program is called BibTeX. It has the advantage that it is very mature and widespread, but the disadvantage that it has severe limitations, due to its age.

Meanwhile, some alternatives have been developed that address some of these limitations. LyX natively supports some of them and lets you select a custom processor. You can do this on a general level in Tools ▷ Preferences ▷ Output ▷ LaTeX or for individual documents in Document ▷ Settings ▷ Bibliography. The following variants are available by default:

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[6]For information on how this is done, have a look at
https://www.ctan.org/tex-archive/biblio/bibtex/contrib/doc/btxhak.pdf.

biber a specific, modern processor developed exclusively for **biblatex** (it does not work with BibTEX!). **biber** provides full Unicode support, unlimited memory and many specific features **biblatex** makes use of; if you use the **biblatex** approach, it is strongly recommended to use **biber**.

bibtex the standard; does not allow special characters in bibliography entries that are not possible to encode in a 7-bit encoding, limited memory, works with all bibliography packages, although it will probably fail with **biblatex** bibliographies due to the limited memory.

bibtex8 allows all characters that are possible to encode in an 8-bit encoding (but no Unicode support), larger memory than bibtex, works with all bibliography packages, although more complex **biblatex** bibliographies will exceed its limits, and not all **biblatex** features are supported.

By default (with the Processor set in Document ▷ Settings ▷ Bibliography and with Automatic as setting for the Processor in Tools ▷ Preferences ▷ Output ▷ LaTeX), LYX selects an appropriate (available) processor for the current bibliography approach (**biber** for **biblatex**, bibtex for BibTEX-based bibliography styles). This should suit most needs.

In Japanese documents, a specific processor is used. By default this is pBibTEX (in LYX pbibtex), a BibTEX variant specifically aimed at Japanese. You can adjust it in Tools ▷ Preferences ▷ Output ▷ LaTeX.

Selected bibliography processors can be controlled with options that you can add below the selection. Before adding options, it is strongly recommended that you read the manual of BibTEX or **biber**, [7, 10].

6.6.2.4. Customizing

LYX supports some specific tasks such as sectioned bibliographies and multiple bibliographies. These are explained in detail in section *Customizing Bibliographies with BibTEX or Biblatex* of the *Additional Features* manual.Citation Format

Many different citation formats are common, e.g. numerical citation (as "1" like in this document), alpha-numerical citations (as "Mil08") or author-year citations (as "Miller (2008a)"). LYX supports these formats via specific citation packages and their style files.

By default a simple numeric citation style is used. In Document ▷ Settings ▷ Bibliography you have a range of other options, depending on your preferred bibliography approach. With the Bibliography environment your only choice besides manual formatting of the bibliography labels, is there to use Natbib (BibTeX) as Style format which gives you author-year and author-numerical citations (see above 6.6.1 for details).

With a bibliography database (see 6.6.2) one has in contrary to the Bibliography

environment full access to the formatting styles. These style formats are available:

Basic (BibTeX) the default BibTeX-based approached without any additional packages (simple numeric citations).

Biblatex loads the package **biblatex** and lets you select a style in the dropdown boxes Biblatex citation style and Biblatex bibliography style below. Options to the package **biblatex** can be entered in the Options field.

Biblatex (natbib mode) loads the package **biblatex** with the natbib compatibility mode. This is a specific variant for users who switch an existing document that uses **natbib** or want to emulate the **natbib** behavior very closely. Compared to normal Biblatex this option has some additional styles. All **biblatex** styles are also supported by this variant.

Jurabib (BibTeX) loads the package **jurabib** which provides author-year styles particularly suited for law studies.

Natbib (BibTeX) loads the package **natbib** which provides citation styles particularly suited for the humanities.

The Biblatex and Natbib style formats provide the choice between author-year and author-numerical citation styles. You have to select one style in the dropdown box Variant. Note that for the Biblatex formats, this only affects the appearance in the LyX workarea. Whether the output uses numerical, author-year or another format such as alpha-numerical depends only on the selected Biblatex citation style. However, when switching between Author-year and Author-number, a suitable style is proposed. With Natbib, on the other hand, the dialog selection will ultimately determine the style.

For any author-year and author-numerical selection, multiple style variants are available in the Citation dialog. Some selections also provide further options like the option to uppercase a name prefix such as "van Beethoven" (to "Van Beethoven") or to expand or reduce the number of displayed others (i. e. use or don't use "et al.").

In the citation dialog you can also set text to appear after a citation reference, e. g. page numbers, which will then be formatted according to the style's needs (e. g. with or without "pp."). The option Literal in the citation dialog allows to input TeX code to the fields Text before and Text after. Here is a simple example where the text "Chapter 3" appears after the reference:

Have a look at [1, Chapter 3].

All styles except for Basic (BibTeX) also provide the feature to add text that precedes the reference (such as "cf."). This text is then also included in the parentheses, if the style requires this.

Note that these pre- and postnotes apply to the whole citation. So if you refer to multiple references at once, the prenote will precede the first citation in the list, the

postnote will follow the last. Some Biblatex styles allow to add pre- and postnotes to any individual reference in a multi-citation (so-called "qualified citation lists"). LYX supports this. If you use such a style and if the current reference includes multiple items the Citation dialog will display three columns in the field Selected Citations: Text before, Cite key and Text after. If you double-click on an item's Text before or Text after field, you can add such individual pre- and postnotes. In the General text before and General text after fields you can add pre- and postnotes that apply to the whole list.

6.6.3. Opening cited documents from within LYX

LYX supports opening documents selected citations point to via the Try to Open Citation Content... context menu if specific conditions are met:

- If citation entries include any of the fields `url` or `doi` for BibTeX and BibLaTeX, `eprint` for BibLaTeX (covering arXiv, JSTOR, PubMed, HDL, Google Books `eprinttype`), the action will launch a web browser with the appropriate link.

- If citation entries include any of the fields `file` (filled by JabRef and Zotero) or `localfile` (filled by KBibTeX) containing an URL that points to a file on your local drive, the action will launch an appropriate file viewer. At the moment only absolute paths are accepted.

In addition to that, LYX also searches[7] your disk for matching files if you enable Search drive for cited files in Tools ▷ Preferences... ▷ Edit ▷ Control. It uses the tokens supplied at Pattern in the same preferences section (by default: year and authors[8]). Any of the tokens in the pattern must occur in the name of the file (at arbitrary position). LYX opens the first matching file it finds. This might or might not be the file you are looking for; the more systematic your file naming is, and the less ambiguous keywords you use, the greater the chance this works for you.

The pattern syntax uses specific keywords. These are basically BibTEX fields (such as `title`) embraced in `%`, but there are also special keys, which are documented in the *Customization manual*, sec. *Cite format description*.

6.6.3.1. Security implications

Note that any document (or mainly `.bib` file in this case) coming from a third party might contain malicious links or otherwise malformed URLs and we suggest you do

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[7]By default we provide python script `lyxpaperview.py` for the search, but you can use any modified script by setting `\citation_search_view` variable in the file `preferences` in your local configuration directory (please refer to the respective section at Help ▷ Customization). The default setting is to be found in the file `lyxrc.defaults` in the same directory and can be copied and modified for this purpose.

[8]Provided by token sequence `%year% %abbrvciteauthor%`. Note that some constituents ("and", "et al.", commas) are automatically stripped from the result.

not use this feature for other documents than those you prepared yourself.

For that reason the searching on disk is disabled by default and you will be asked for confirmation of viewing all the links (both can be bypassed, but beware what you are doing).

6.7. Index

An index entry is created if you use the menu Insert ▷ Index Entry or the toolbar button
▦ (but see section 6.7.7 for some advanced methods). A collapsible inset with green label is inserted; this holds the text that appears in the index (if you read this in LYX, see the "Index generation" index inset in the heading above for example). The word where the cursor is in, or the currently highlighted text, is proposed by LYX as index entry (i. e., copied into the inset).

The index list (which prints out the index in your document) is inserted via the menu Insert ▷ List/Contents/References ▷ Index List. A light blue box labeled "Index" will show the place where the index will be printed. By default, the index list box is not clickable like other LYX insets, as there are no settings to make. This changes if you select "Use multiple indexes" (see section 6.7.9). In this case, the box turns gray and can be clicked (as there are now settings that can be made).

By default, an index entry is simply a word or phrase in the (alphabetically ordered) index list with a reference to the page or pages where the index entry has been inserted in the document. However, you can customize index entries to look different. You can group index entries hierarchically, let the index list refer to a range of pages rather than a single page, let it refer to another entry in the index list rather than, or additionally to, a page, you can format the page reference (e. g., make it bold for specific pages), and you can determine the order of an entry in the list. These features are available in LYX either as "subinsets" via the menu Insert ▷ Index Properties that appears if the cursor is in an index entry or via the index settings dialog which can be opened via right mouse click on the index inset.

We describe these features in turn in the next subsections. For a detailed description of LATEX's index mechanism, have a look at one of the LATEX books [1, 2, 3].

6.7.1. Grouping Index Entries

Index entries are often hierarchically grouped to offer the reader a fast search in the index and to hold categories together (e.g., *Fruits ▷ Apples ▷ Pink Lady*). This can be done in LYX via Insert ▷ Index Properties ▷ Subentry or, more easily, by pressing the Enter key in an index. Both methods insert a subinset in which you can enter the subentry. Maximally two such subentry insets, i. e., three levels of grouping in total, are allowed per index entry. Note that it does not matter where you insert these

subentry insets in the index inset, but the order of them matters and determines the grouping hierarchy. In the LyX file, the index entry in the header above shows an example for a two-level grouped entry (and you can see the result in the index of this document at the entry *Index ▷ Grouping*).

In the output, each subentry is on a new line and indented a bit more. Note that the higher levels only get their own page references if they have also a separate entry (without subentry).

Note also that in LaTeX, subentries are indicated by a preceding exclamation mark character "!". This also works in LyX, although you have to take care that the character is not formatted. For this reason, a real exclamation mark has to be inserted to an index entry in a specific way. See section 6.7.6 for details.

6.7.2. Page Ranges

By default, an index entry refers to single pages where the index entries have been inserted. If you want to refer to a page range instead, you can do this by inserting two index entries: one that marks the beginning of the range, the other that marks its end. Both need to contain the same index entry (and possibly subentries) text. To mark start and end, select the respective **Page Range** option in the index inset settings dialog. Range starts and ends are indicated in the index inset label via "(" and ")".

Note that you have to take care that range markers are complete. If a range start without a respective end (or vice versa) is found, the index processor might terminate and not produce an index without informing you about the reason.

6.7.3. Cross Referencing

It is also possible to refer to another index entry rather than, or in addition to, a page. This might be useful if you anticipate that your readers might look for an entry at different places, e. g., *Graphics* or *Images* (which could be resolved by a cross reference "Images, *see* Graphics") or also if you use hierarchical grouping (section 6.7.1), as in "Apples, *see* Fruits".

This is possible in LyX via **Insert ▷ Index Properties ▷ See**.

If you want a cross-reference and page references, you can use **Insert ▷ Index Properties ▷ Seealso**. This outputs "see also" instead and makes more sense if you also add entries that are referred to by page number as in "Apples, 3, 12, 22, *see also* Fruits".

6.7.4. Index Entry Order

Sometimes the automatic ordering of index entries is not the one you want. This might be the case with some index processors (such as makeindex) if you use accented characters in the index entry or if you use macros.

To accommodate for that, you can use Insert ▷ Index Properties ▷ Sortkey. The sortkey you enter here is not output in the index, it is just used for sorting (instead of the actual entry). For instance, you can pass the sort key "zizek" to sort the name *Žižek* should your index processor be incapable to sort Slovenian postmodern philosophers correctly.

Note that in LaTeX, sortkeys are separated from the actual entry by the character "@". This also works in LyX, although you have to take care that the character is not formatted. For this reason, a real @ character has to be inserted to an index entry in a specific way. See section 6.7.6 for details.

6.7.5. Index Entry Formatting

The appearance of index entries can be formatted as usual via the text style dialog, the toolbar or shortcuts. Entries will appear in the index list in the way they are formatted in the index entry. Note that this also means that two differently formatted otherwise identical entries, e. g. *Bananas* and **Bananas**, will be listed separately.

To format a page reference, use the Format option in the index entry settings dialog. You can either select one of the proposed formatting options (Bold, Italic, Emphasized) or Custom. With the latter, you are supposed to enter a valid LaTeX macro *without* leading backslash, e. g. a self-defined command `myformat` or an existing macro such as `textsf`.

In general, we encourage you to use self-defined commands. This makes it easier to change the formatting, should you or your publisher decide to do that later. For instance, add a formatting macro for index entries that refer to the page(s) where the indexed term is defined by putting the following in the preamble

\newcommand*\IndexDef[1]{\textit{#1}}

and add the custom formatting `IndexDef` to the respective entry settings dialog.

This will cause all page references that use this custom format to be printed in italics. If you change your mind later or if your publisher insists that definitions must not be italic but bold, you just need to change the macro in the preamble, not every single index entry.

Note: If you use the index processor xindy rather than makeindex or xindex (see section 6.7.8), such custom macros do not work out of the box. This is because xindy requires you to define semantic elements in the xindy "module" (style file) you use

before they can be used. In the given case, this would require to add the following line in the module file:

```
(markup-locref :open "\IndexDef{" :close "}" :attr "IndexDef")
```

Please refer to [1, p. 678 ff.] for details.

You can also change the layout of the whole index. For example, if you mark the index list box as bold, you will get a bold font for all index entries. In general, however, it is better (and required for more advanced tasks) to set up a so-called *Index Style File* (makeindex), *module* (xindy) or *config file* (xindex) to determine the formatting; please refer to the makeindex, xindy or xindex documentations for details, [11, 13, 14]. There are also some LaTeX packages available that ease such formatting, see https://ctan.org/topic/index.

6.7.6. Special Characters in Index Entries

As already mentioned above, some characters have a special meaning in index entries, namely: !, @, ", and |. If you use them literally, you might get surprising results or even a non-working index. In any case, you will not get the character itself.

In order to use these characters in inset entries, they have to be 'escaped', that is prepended by a character that tells the index processor to treat this character without its special meaning. By default, the escape character is " (but this can be changed). So enter "!, "@, "", or "| to get the special character you want. Note that the escape character, ", *must* be inserted in a TeX code box (see section 6.11.1).

6.7.7. Convenience Functions for Index Handling

Indexing a document can be a tedious task, since you often have to insert the same index entry multiple times in order to refer to passages at different pages. This is not only time-consuming, but also error-prone; e. g., you have to remember how exactly an inset entry has been inserted to avoid redundant entries. LyX provides some functions to ease the task.

First, if you want to add an entry which you already used before, you can open the outliner via View ▷ Outline Pane (see section 2.6.1), select the Index Entries section (it is convenient to have this open while indexing anyway), scroll to the entry in question (if you check Sort, it will be more easier), then *right*-click on the entry and select Insert Copy at Cursor Position from the context menu. This will do just what it says: it will insert a copy of that index inset at the position where the cursor is.

Second, LyX also provides a semi-automated solution to index a word. If you right-click on an index entry inset, you can select from the context menu Index All Occurrences of this Word. This will search the whole document (only single documents,

not master and child documents) and insert a copy of this index inset after each occurrence of the word that precedes the inset. Note that casing of the word does not matter, but only full words in the same grammatical form are considered (so if *table* is the word before the index entry, *Table* will be considered as well, but not *tables*). Please take care to not overuse this function and to carefully check the result afterwards. Remember, a good index does not simply list all occurrences of a given word in a specific document (that is a concordance rather), but only relevant occurrences! So as convenient as this function might seem, it is suitable especially for particular cases. With others, you will have more work with removing again falsely inserted entries than you would have with manually inserting them at the right place.

6.7.8. Index Processor

If the index processor, xindy, is installed, LyX uses it (the texindy variant of it, for that matter) for index generation; otherwise the program makeindex, the program that is part of every LaTeX distribution, is used. As a further option, you can select the rather new xindex index processor.

- Makeindex is very old, no longer under development and has many pitfalls, notably that it was developed with only the English language in mind. So it fails to sort anything other than a monolingual English text correctly (we have shown above, section 6.7.4, how to manually fix this sorting, but this is very tedious work).

- The alternative program, xindy, is a newer and much more mighty alternative. It can sort most languages correctly, and it is also much more customizable in the output. However, also xindy is no longer actively maintained, and it has bugs that are most likely not being addressed anytime soon. Also, xindy is not always available out of the box and quite a challenge to install on some systems (particularly Windows). But if you have it available, it is almost always a better option than makeindex.

- The third option, xindex, is a quite new and actively developed index processor. It is included in modern TeX distributions such as TeXLive and MikTeX, is pretty much customizable and supports many languages. The program is still in development, so not everything might work equally well than in the older processors. But the program is definitely worth a try, particularly if xindy does not work or not satisfy your needs.

All processors can be controlled by options that can be set in LyX's preferences dialog, see section C.6.2. The available options are listed and explained in [12, 13, 14]. In this dialog, you can even specify arbitrary alternative programs to generate the index.

If you need specific options or an alternative index program only for a given document, you can define the program and/or the options in Document ▷ Settings ▷ Indexes. This

is especially useful if you need to pass language-specific options to the index program
or if you need a specific layout style.

6.7.9. Multiple Indexes

In many fields it is common to have more than one index. For instance, you might
need to set up a separate "Index of Names" next to the standard index. LaTeX does
not provide this possibility out of the box, but there are packages that add this
feature. LyX uses the **splitidx** package to generate multiple indexes. The package
is included in all recent LaTeX distributions.[9]

To set up LyX for the use of multiple indexes, go to Document ▷ Settings ▷ Indexes and
select the option Use multiple Indexes. Note that the list Available Indexes already
contains the standard index "Index". To add further indexes, add the name of the
index (in the form that should also appear as a heading) to the New input field and
press the Add button. The new index now also appears in the list. If you like, you
can attribute an alternative LyX label color to the new index.

Once the document changes have been applied, you can find the new index list in
Insert ▷ List/Contents/References and the Insert menu has a separate entry for each of
the defined indexes. The workflow is basically the same as for the default index, but
there are additional features:

- If you want to change the attribution of a specific index entry, right-clicking on
  the entry's label will open a dialog where you can do that.

- By right-clicking on an index, you can change its type. Furthermore, you can
  specify an index to be a Subindex. If you do that, the heading of that list will
  be decreased by one level. For example, if you use a book class, where the
  standard index heading is defined as a chapter, subindexes will be defined as
  sections and can thus be nested to the non-subindexes.

- The option Literal allows to use TeX code in the name of the index.

6.8. Nomenclature/Glossary

Sometimes you need to provide a list of technical terms or symbols that are mentioned
in your document with a brief explanation of them – a so called nomenclature or
glossary.

To be able to create nomenclatures or glossaries, you need the LaTeX package **nomencl**
installed. You find it in the TeX catalogue, [5] or in the package manager of your

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[9]If yours does not ship it, consult the TeX catalogue, [5]. Note that the package does not only
consist of a LaTeX style, but it also includes specific preprocessor programs that need to be
installed as well. Please consult the package's manual for details.

LaTeX-system.

A nomenclature entry is created if you place the cursor after a symbol entry and then use the menu Insert ▷ Nomenclature Entry or the toolbar button 🔲. A gray box labeled "Nom" is inserted and a window pops up asking for the nomenclature entry.

A nomenclature entry consists of two main entries. The first is the term or Symbol that you wish to define. The second is the Description of the term or symbol.

Note: To use TeX code for nomenclature entries the option Literal in the nomenclature dialog has to be used.

6.8.1. Nomenclature Definition and Layout

If you have symbols in formulas, you have to define them in the Symbol field as LaTeX formulas. For example to get "σ", insert this:

\$\sigma\$

The "\$" character starts/ends the formula. The LaTeX-command for the Greek letter is the name of the letter beginning with a backslash "\". For capital Greek letters, start the command also with a capital letter, like **\Sigma**.

(A short introduction to the LaTeX syntax is given in section 6.11.2.)

You cannot use the Text Style dialog to format the description text; you have to use LaTeX-commands. For example the description of the nomenclature entry for the "σ" in this document is:

dummy entry for the character \textsf{sigma}

The command **\textsf** sets the fonts to sans serif. To get **bold** font use the command **\textbf**, for `typewriter` use **\texttt**, for *emphasized* use **\emph**.

To customize the appearance of all symbols add e. g. the command

\renewcommand{\nomlabel}[1]{\textsf{\textbf{#1}}}

to the LaTeX preamble in the document settings. This command will make the font of all symbols **bold** and sans serif.

If the characters | , ! , @ and " should appear in nomenclature entries containing TeX code they need to be escaped by adding a percent character in front of them.

6.8.2. Sort Order of Nomenclature Entries

The nomenclature entries are sorted alphabetically by the LaTeX-code of the symbol definition. This leads to undesired results when you, for example, have symbols in formulas. Suppose you have nomenclature entries for the symbols a and σ. They will be sorted by "a" and "\$\sigma\$" – the σ will be sorted before the a since the character "\$" is considered in sorting.

To control the sort order, you can edit the Sort as field of the nomenclature dialog. Then the nomenclature entry will be sorted by this entry and not the symbol definition. For the example given, you can insert `sigma` in this field for the σ, then a will be located before σ.

For subgrouping and tips for using sort entries see the **nomencl** documentation, [21].

6.8.3. Nomenclature Options

The **nomencl** package offers some options to adjust the appearance of the nomenclature. Here are some of its options; for more have a look at its documentation:

refeq Appends the phrase ", see equation (*eq*)" to every nomenclature entry, where *eq* is the number of the last equation in front of the nomenclature entry

refpage Appends the phrase ", page (*page*)" to every nomenclature entry, where *page* is the number of the page on which the nomenclature entry appeared

intoc Inserts the nomenclature in the Table of Contents

To use one or more of the options, add them to the comma-separated document class options list in the Document ▷ Settings dialog. In this document the options **refpage, intoc** are used.

You can also use the first two options above only for certain nomenclature entries when you add one of the following commands as last entry to the Description field in the nomenclature dialog:

\nomrefeq Like the **refeq** option

\nomrefpage Like the **refpage** option

\nomrefeqpage Short notation of **\nomrefeq\nomrefpage**

\nomnorefeq, \nomnorefpage, \nomnorefeqpage Turns off the corresponding options

Words like "page" are automatically translated for most document languages. If not, add these lines in front of the nomenclature list as TEX code:

\renewcommand*{\eqdeclaration}[1]{
\unskip, see equation\nobreakspace(#1)}
\renewcommand*{\pagedeclaration}[1]{
\unskip, page\nobreakspace{}#1}

If the numbers should be hyperlinks, assure that you use Hyperref Support in the document settings under PDF Properties and use instead:

\renewcommand*{\eqdeclaration}[1]{
\unskip, see \hyperlink{equation.#1}{equation\nobreakspace{}(#1)}}

\renewcommand*{\pagedeclaration}[1]{
\unskip, \hyperlink{page.#1}{page\nobreakspace{}#1}}

6.8.4. Printing the Nomenclature

To print the nomenclature, use the menu Insert ▷ List/Contents/References ▷ Nomenclature. A box labeled "Nomenclature" will show the place where the nomenclature is printed in the output. By right-clicking on it, the amount of space for symbols can be altered. You can choose between these settings:

Default a space of 1 cm is used

Longest label width the width of the widest symbol of all nomenclature entries is used

Custom custom space

In the printed output the title of the nomenclature appears as "Nomenclature". If you are not happy with the name, you can change it by redefining the command **\nomname** in the preamble. For example, in order to change the name to *List of Symbols*, add the following line to the preamble:

\AtBeginDocument{\addto\captionsenglish{\def\nomname{List of Symbols}}}

When you are using another document language than English, replace **\captionsenglish** by **\extras*****, where *** is the name of the language used.

6.8.5. Nomenclature Program

LyX uses the program makeindex, that is part of every LaTeX distribution, to generate the nomenclature. LyX's preferences dialog allows you to specify another program or to control makeindex by adding options, see section C.6.2. The available options are listed and explained in [21, 11].

6.9. Branches

Sometimes it is useful to hide some document parts in the output. For example a teacher who is setting an exam obviously doesn't want the pupils to see the answers, but having questions and answers in the same document will make the life of the markers of that exam much easier.

For these cases LyX allows you to put text into branches. The text will then only appear in the output when its branch is activated. To create a branch, either select the menu Insert ▷ Branch ▷ Insert New Branch (if you just want to specify a new branch)

or go in the Document ▷ Settings dialog to Branches, where you can specify and change the name of the branch, its activation state (whether the content of the branch is shown in the output or not), its background color inside LyX and whether the name of the branch should be appended to the document file name on export if the branch is active (see below for an example). Furthermore, the dialog lets you merge two branches (just rename one branch to the name of the other) and to add "unknown branches" (i. e. branches that were added to the document via copy and paste from other documents, without having been defined) to the document's branch list.

Text that should be in a branch is set into branch inset boxes. These boxes are inserted via the menu Insert ▷ Branch where you can choose a branch. You can later change the activation state of the branch by right-clicking on them.

Here is an example, where only the question text appears, the answer branch is deactivated and therefore does not appear in the output:

Question: Who was the first physics Nobel prize winner?

If you activate Filename Suffix in Document ▷ Settings ▷ Branches, the name of the active branches will be appended to the file name at export. Consider for example a file "Exam.lyx" which has the above branches. If "Filename Suffix" is active, the PDF export file would be called "Exam.pdf" if both the "Question" and "Answer" branch were inactive, "Exam-Question.pdf" if only the "Question" branch was active, likewise "Exam-Answer.pdf" if only the "Answer" branch was active, and "Exam-Question-Answer.pdf" if both branches were active. This helps you to export different versions of your document easily.

It is also possible to invert just some branch insets, whose content is output just in case the branch is *not* activated (they are marked with ~ before the name). Such insets make it easy to add alternative text for different versions of a document. To control whether a particular inset is inverted, right-click on the inset button and choose Invert Inset.

No answer: Because the "Answer" branch is deactivated.

To use conditional output inside places where you cannot insert branch insets, like inside equations, you can code special LaTeX definitions for each branch. For example you can define for the question branch[10]

\newcommand{\question}[1]{#1}

\newcommand{\answer}[1]{}

and for the answer branch

\newcommand{\question}[1]{}

---

[10]For an introduction to the LaTeX-syntax, see section 6.11.2.

\newcommand{\answer}[1]{#1}

Now it is possible to use the **\question{...}** and **\answer{...}** commands to obtain conditional output. Here is an example formula where only the **\question** part appears:

$$x^2 - 2x - 2 \Rightarrow x_1 = 1 + \sqrt{3}.$$

Inside math, the same effect can be achieved using math macros, see the *Math* manual.

Each type of branch is allowed to have its specific style defined in layout files (e. g. any branch inset can be automatically wrapped by your own LaTeX commands.). For this advanced usage, see the *Customization* manual, section *Flex insets and InsetLayout*).

In case you often need to keep all branches of a given name in sync as far as their open/close status is concerned, you can use the LyX function `branch-sync-all` that sets the open/close state to all branches of the same name from the branch currently at cursor. You can bind it to a keyboard shortcut or add it to a user-defined context menu for branch insets.

6.10. PDF Properties

Document ▷ Settings ▷ PDF Properties allows you to set up specifics of your document's PDF output. Most of these specifics are provided by the LaTeX package **hyperref** which you need to enable by clicking Use Hyperref Support in order to set the PDF properties (if the package is already loaded by your document class or another package, the checkbox you need to click is labeled Customize Hyperref Options instead). Among other things, hyperref hyperlinks all URLs and cross-references in the PDF output. This means that the reader of your document will be able to click on an URL, a table of contents entry or on a reference to open a website or to move to the cross-referenced part of the document. Furthermore, you can set PDF metadata (such as document author and title), or determine how the PDF is being opened by the reader program.

The header information in the dialog tab General is saved together with the PDF as file properties. Many programs are able to extract this information, for example, to recognize who the author is and what the PDF is about. This is very useful to sort, classify or use PDFs for bibliography issues. When the option Automatically fill header is set, hyperref tries to extract the header information from your document title and author entries. The option Load in fullscreen mode will open the PDF in fullscreen mode, which is useful for presentations.

In the dialog tab Hyperlinks you can customize the look of such links, and you can specify if and which bibliographical backreferences are created. Backreferences are links inserted at the end of bibliographic entries pointing to either sections, pages or slides on which these entries are being cited. The Break links over lines option allows

long links to be split; **No frames around links** and **Color links** both turn off the default behavior of enclosing all links in frames; **Color links** colors the different links. The default colors are:

magenta   for hyperlinks and URLs

red   for links

green   for citations

but you can change these in the tab **Additional Options**. For example, in this document they were changed with these additional options added to **Hypersetup**:

linkcolor=black, citecolor=black, urlcolor=blue, filecolor=blue

In the dialog tab **Bookmarks** you can specify if PDF bookmarks (shown as a collapsible outline in the PDF reader) should be created for every section of your document to make it easier for readers to navigate through the document. You can decide if the bookmarks should be numbered like your document sections or not. By checking **Open bookmark tree** you can instruct the PDF reader to uncollapse the outliner when opening the PDF. **Level** determines up to which level this uncollapsing is done. For example level 2 will display all sections and subsections, while level 1 will only display the sections (collapsing the rest).

In the **Additional Options** dialog tab you can insert hyperref options which are not among the ones described above as a comma-separated list (please refer to the hyperref manual [19] for a full list and documentation of possible options). Note that these options will be passed to hyperref via `\hypersetup`, not via the package options. This will exclude some options that can only be specified via the latter. If you need to use one of those options, you can set them by adding

PackageOptions hyperref option1,option2

in **Document ▷ Settings ▷ Local Layout** (but only if hyperref is not loaded by your document class).

The **Document Metadata** input widget allows you to insert PDF properties that are independent of the hyperref package and rely on some (rather new) LaTeX core features. This requires LaTeX version 06/2022 at least (with earlier versions, input is simply ignored). The widget expects a comma-separated list of key-value options (such as **pdfversion=1.7, lang=de-DE**). At the point of writing this, the list of options is still rather small and not very well documented (look for a file called *documentmetadata-support.pdf*), but it is expected that in the future, rather fundamental PDF properties (such as structure tagging for accessibility reasons and different PDF standards such as PDF/A) can be set this way.

6.11. TₑX Code and the ᴌᴬTₑX Syntax

6.11.1. TₑX Code Boxes

As LyX uses ᴌᴬTₑX in the background, it supports many ᴌᴬTₑX commands and constructs, but not all. ᴌᴬTₑX contains hundreds of packages that provide different commands. All the time packages are being updated and new ones added. This has the advantage that you can typeset nearly everything as there is a ᴌᴬTₑX-package for every problem, though LyX cannot support all packages and their commands.

But don't worry, you can use any ᴌᴬTₑX-command directly in LyX inside the TₑX Code box. A TₑX Code box is created by the menu Insert ▷ TeX Code or by the toolbar button ᴛₑₓ (shortcut Ctrl+L). The box can be opened by left-clicking and closed by right-clicking on it and selecting Close Inset.

You can insert complete or incomplete commands as TₑX Code. Incomplete means that the command argument can be Standard LyX text. For example, if you want to draw a frame around a word[11] and are therefore using the ᴌᴬTₑX-command **\fbox**, you can write the command part **\fbox{** in a TₑX Code box before the word and the closing brace **}** in a second TₑX Code box behind the word. The word between the two TₑX Code boxes is then the argument as it is in the following example:

This is a line with a \fbox{ framed } word.

gives

This is a line with a ⌜framed⌝ word.

Note: At the end of ᴌᴬTₑX-commands without parameters, you have to insert a space to let ᴌᴬTₑX know that the command is finished.

6.11.2. A Short Introduction to the ᴌᴬTₑX Syntax

When you write larger documents or books, you will need to know something about the ᴌᴬTₑX-commands that LyX uses in the background. Because ᴌᴬTₑX is based on commands, you can "program" your text. This has the advantage that the layout of the document can be changed at any time if you know the right commands. For example, imagine you have to write a manual for a product and the deadline is the end of the day. Your boss has just complimented you for your good work but wants to have all caption labels bold. But you have over a hundred figure and table captions with non-bold labels in your manual. Of course it is impossible to change all caption labels manually in one day.

Now ᴌᴬTₑX comes into play. As mentioned above, for every problem there exists a ᴌᴬTₑX-package. First you have to find out which and therefore look in the ᴌᴬTₑX

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[11]The LyX way would be to use a framed box.

package database, [WCT].

As result you find that the package **caption** is what you need. To use a package, you have to load it in the document preamble (menu Document ▷ Settings ▷ LaTeX Preamble) with the command

\usepackage[options]{package name}

All LaTeX commands begin with a backslash, the command argument is set within two braces and the options are set within two brackets. Note that not all commands have an argument and options.

In your case the package name is **caption**. After a look in the documentation of the package, you know that the option **labelfont=bf** will change the font of all caption labels to bold. So you add the command

\usepackage[labelfont=bf]{caption}

to the preamble and the problem is solved.[12]

Note that some document classes have built-in solutions for well-known problems like your case. For example if you use a KOMA-Script class, you don't need the package **caption**, you can instead write

\setkomafont{captionlabel}{\bfseries}

in the preamble and the problem is solved. So if you plan to write a large document, you should have a look at the documentation of the document class you want to use. (**\setkomafont** is an example of a command with more than one argument.)

Commands in the preamble affect the whole document, while commands in the text affect only the text after the command or only the text used as command argument. To insert a LaTeX-command in text, use the TeX Code box as described in the previous section.

If you want to learn more about LaTeX and its syntax, have a look at the LaTeX-books [1, 2].

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[12]For more commands provided by the **caption** package, have a look at its documentation, [16].

6.12. Customized Page Headers and Footers

To define a custom page header and footer line for your document, you need to set the Page style to Fancy in the Document ▷ Settings dialog under Page Layout. As a second step add in the menu Document ▷ Settings ▷ Modules the module "*Custom Header/Footerlines*". This module offers the following 6 environments:

Left Header, Center Header, Right Header

Left Footer, Center Footer, Right Footer

for the different positions in the header/footer. These environments can be selected in the environment pull-down box.

Normally, headers and footers are set up at the beginning of the document. But you can change them anywhere you want to. Figure 6.1 shows the page layout and where the header/footer styles will appear.

Left Header	Center Header	Right Header
The normal text on the page goes here. The running header is above the text, and the footer is below (including footnotes). Headers/footers typically contain things like the page number, title of the chapter, company logo but you can use almost anything, except of floats.		
Left Footer	Center Footer	Right Footer
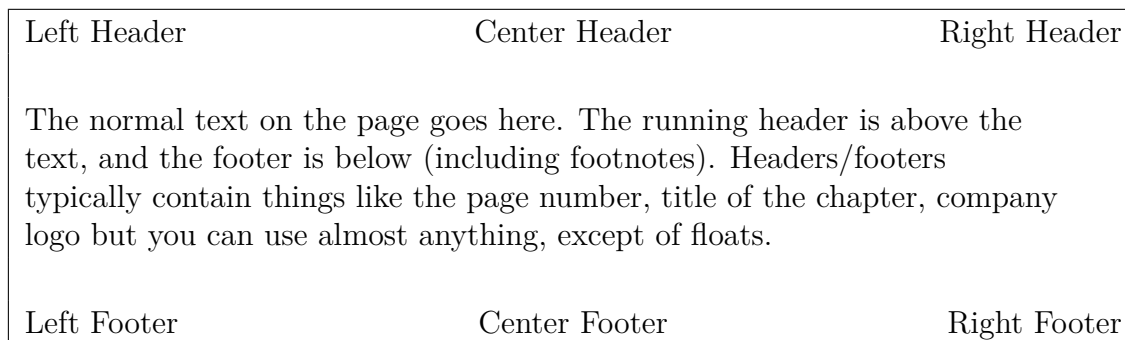
Figure 6.1.: Page layout with custom header and footer line.

Note: some document classes implement their own customized page headers and footers if Page style is set to "Default". Check what these are before you specify your own customized page headers and footers.

6.12.1. Definition

To define your header line, add all three header environments. The things you add to each environment appear on odd numbered pages, the things in the optional arguments on even numbered pages. For single-sided documents, the optional arguments will not be used and can be omitted. If you leave a header environment or its argument empty, nothing appears in the output. Defining the footer line works similarly.

For the definition, you will need some LaTeX-commands that are inserted as TeX code (menu Insert ▷ TeX Code):

\thepage prints the current page number

\Roman{page} prints the current page number with capital roman numerals

<div align="center">

Magic code: CXXIII

$\Upsilon = \frac{\sqrt[3]{\aleph}}{\spadesuit}$

</div>

\roman{page} prints the current page number with small roman numerals

\leftmark prints the current section number and title. If the document has chapters, it prints the current chapter number and title instead. It is called "leftmark" because it usually goes in a left header.

\rightmark prints the current subsection number and title. If the document has chapters, it prints the current section number and title instead. It is normally used in the right header.

6.12.2. Default header/footer

The custom header/footer is not empty by default. The default header contains the chapter and section title and the center footer has the page number. In order to remove unwanted entries from the header/footer, include the relevant header/footer style in your document, but leave it blank. So, if you do not want a page number in the footer, include a blank Center Footer style.

6.12.3. Appearance

The header and footer will appear on normal pages. Some pages are different. The title page has a header/footer environment of its own, and so does any page that starts a new part or chapter in your book. Such pages will not have the custom headers/footers, but that is normal. There is for example no need to print a header with the chapter name on the chapter page where the chapter heading is in big bold letters anyway.

6.12.3.1. Header and footer decoration line

By default, you get a $0.4\,\text{pt}$ thick line below the header and no footer line. This can be changed in the document preamble with the commands **\headrulewidth** and **\footrulewidth** in the following way:

\renewcommand{\headrulewidth}{thickness}

where thickness is a size in standard units like *pt* or *mm*. If you don't want a line, set the thickness to $0\,\text{pt}$.

The lines can also be colored, but this requires more knowledge of LaTeX. If you really need this, have a look at the Internet or in section 4.4 of the book [MG04].

6.12.3.2. Several header/footer lines

In case you need more than one text line as a header/footer, you can do this by adding a ragged line break in the style definition. However, the default height of the

header/footer is only the height of one text line. To expand the height, redefine the LaTeX length **\headheight** or **\footheight** with this entry in Document ▷ Settings ▷ LaTeX Preamble:

\setlength{\headheight}{height}

where **height** is a size in standard units (e. g. **1cm**). If you don't know how much space is needed for the height, define your header/footer and preview your document as a PDF. Then open the LaTeX logfile with the menu Document ▷ LaTeX Log and use the button Next Warning to see if you can find a warning about the package **fancyhdr**. If there is such a warning, it contains the space that you need at least for your header/footer.

6.12.4. This example

This example demonstrates what can be done with custom header/footers. Don't use it for your document as it is just an example. This example consists of the following definition:

Left Header **\rightmark**, empty optional argument

Center Header empty, empty optional argument

Right Header empty, **\leftmark** in the optional argument

Left Footer empty, **\thepage** in the optional argument

Center Footer L_YX's user guide, "Magic code:
$\Upsilon = \frac{\sqrt[3]{\aleph}}{\spadesuit}$" in the optional argument

Right Footer **\Roman{page}**, empty optional argument

\headrulewidth set to $2\,\text{pt}$

In principle you can use almost everything in headers/footers, except floats. For more specialized features, for example, thumb-indexes, see the manual of the **fancyhdr** package, [18].

6.13. Previewing Snippets of your Document

LyX allows you to generate previews of sections of your document on the fly so you can see how they will look in the final document without having to break your train of thought with viewing the output.

6.13.1. Prerequisites

To get previews working, you need the LaTeX package **preview-latex** (on some systems named simply **preview**) installed. If it is not already installed, you will find it in the TeX-catalogue, [5] or in the package manager of your LaTeX-system. You obtain prettier results if you install the program `pnmcrop` from the `netpbm` package; for LyX on Windows this program and also the LaTeX-package are automatically installed together with LyX.

6.13.2. Enabling previews

If you would for example like to see in LyX your math formulas typeset by LaTeX, activate the option Display Graphics in the Tools ▷ Preferences dialog under Look and feel ▷ Display. Then set Instant Preview to On. The Preview Size is the multiplication factor for the size.

If you would like to see everything but your math formulas typeset by LaTeX, set Instant Preview to No math.

Previews are generated when you load a document into LyX and when you finish editing an inset.

Note: Previews of an already loaded document are not in every case immediately generated by activating the option Display Graphics. Reopening the document will fix such problems.
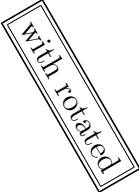
6.13.3. Selected document parts

Besides math there are other cases where you might like to see a preview, for example things that LyX cannot render like rotated parts or things that are not yet supported by LyX. To do this, insert a preview inset via the menu Insert ▷ Preview. Insert or paste the stuff that you want to preview into this inset. The preview will be generated when the cursor is outside the preview inset. If you click on the preview, you can edit the previewed stuff.

An example: To create rotated boxes, you use the LaTeX command **\rotatebox** which is not yet supported by LyX.[13] Instead of the TeX Code boxes you want to see

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[13]**\rotatebox** is explained in section *Rotated and Scaled Boxes* of the *Embedded Objects* manual.

in LYX the final rotated boxes, for example to adjust the rotation angle to fit with the surrounding text. Therefore you create a preview inset and copy the text with the rotated boxes into it. Here is the result:

This is a line   framed text $\int A\,\mathrm{d}x = B$ and a formula.

Previewing works also for colors. In this example a special framed, colored box was created using the LaTeX command **\fcolorbox**:[14]

This is text within a colored, framed box.

If LYX does not show a preview, make sure that you enabled previews as described above and also make sure that TEX Code in the preview inset is valid and that you loaded the LaTeX packages in your document preamble that are required by the TEX Code. If LYX cannot create a preview, you will in most cases also not be able to view your document due to LaTeX errors. So if you have to use some TEX Code and don't know if it is correct, the preview inset is a nice method to check it without the need to view the whole document.

6.13.4. LaTeX source code

You can preview the LaTeX source of the whole document or parts of it. Use the menu View ▷ Source Pane and a window will be shown where you can see the LaTeX-source code. The window shows the source of the whole paragraph in which the cursor currently sits. You can also select document parts in LYX's main window, then only this selection (when it is more than one paragraph) is shown as source code. To view the whole document as source, enable the corresponding option in the source view window. If you check Automatic update, you can see the changes as you make them in LYX; but note that if you have several documents open, this will slow things down as LYX updates them all, not just the one which is open at the time.

6.14. Advanced Find and Replace

6.14.1. Introduction

The advanced find and replace feature of LYX allows for searching of complex, format-sensitive text segments and mathematics contents within LYX documents. It is an enhancement of the standard (quick) find and replace feature. The key-features are:

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[14]**\fcolorbox** is explained in section *Colored Boxes* of the *Embedded Objects* manual.

- Both searching of text and of mathematical formulas is allowed, where the latter is done by entering mathematics in the usual way; not only entire mathematical formulas are found, but also parts occurring within more complex formulas

- Search may be format-insensitive, so that the searched text is found in any context/style (standard text, section headings, notes, and even mathematics), or it may be format-sensitive, so that, for example, a word entered with a section heading will only be found within section headings

- Search may be restricted to mathematics environments only; this is useful for remangling math notation where one does not want to match any text outside of mathematics environments

- Search may be widened to a specific *scope*, i. e. a set of files which may be all the children of the document being edited, all the open files, or all the manuals available from the Help menu

- Replace may optionally preserve capitalization, so that the replaced text capitalization is adapted to the matching text (i. e. all lowercase, all uppercase, first letter uppercase followed by lowercase)

6.14.2. Basic usage

The advanced find and replace feature is activated through the menu Edit ▷ Find & Replace (Advanced) (shortcut Ctrl+Maj+F) or the toolbar button 🔍. This opens the Advanced Find and Replace dialog.

6.14.2.1. Searching for text

Enter into the Find LyX mini-editor a simple word, and search for occurrences of it by clicking on the Find Next button at the bottom of the dialog (or just press the Retour key). The entered word is found both in text mode and in math mode, and in emphasized, bold or normal face, and in both in section titles and in standard text. Pressing Retour repeatedly keeps searching forward while pressing Shift+Return searches backwards.

The Case sensitive option allows matches to occur only with the same case as entered in the Find editor. The Whole words option allows matches to occur only at word boundaries.

6.14.2.2. Searching for mathematics

Mathematical formulas, such as x^2 or something more complex like $\frac{x^2}{1+x^2}$, may be searched for by typing them in the Find editor. When searching for a formula, it is found both when it is alone and when it occurs in sub-formulas and nested parts of

sub-formulas. For example the mentioned segments would be found in something like $\frac{x^2}{\sqrt{\frac{x^2}{1+x^2}}}$.

6.14.2.3. Style-aware search

It is also possible to search for text with specific styles. This is done by switching to the Settings tab of the dialog and unchecking the Ignore format option. This way, entering in the Find editor

- a normal word and searching for it would not find instances of the word occurring in emphasized or boldface.

- an emphasized or boldface word and searching for it would find the respective instances with the same face only, and within the same text style only.

- a normal word in a section heading, and searching for it, would find occurrences of it only within section headings. Also, if the text to search is given an emphasized or bold face, in addition to a section style, then it is found only when occurring with the same style.

- a displayed formula will only find instances of this formula that are also displayed formulas (and not inline formulas).

6.14.2.4. Replace

The entries made in the Find editor can be replaced with entries made in the Replace with editor. In order to find the next occurrence and replace it, click on the Replace button or alternatively press Retour or Shift+Return while the cursor is in the Replace with editor.

You can replace with fully-featured formatted LyX entries. Typical scenarios in which to use this capability might be (just to mention two):

- replacing occurrences of a word with a customized formatted version of the same word, for example replacing occurrences of a name like "func()" with its typewriter version "`func()`"

- performing a notation rework of mathematical symbols, for example replacing occurrences of "R" with "$\mathbb{R}$" (you may want to enable the Whole words and Case sensitive options and disable the Ignore format option in the Settings tab, in order to avoid replacing all "R" letters occurring in normal text), or occurrences of x_j^i with $x_{i,j}$, or occurrences of $x[k]$ with x_k.

6.14.2.5. Advanced usage

There is a regular expression (regexp) based searching facility.[15] You can search for a regular expression by inserting a regexp inset into the Find editor. This is done with the context menu Insert ▷ Insert Regular Expression while the cursor is in the Find editor. Characters entered within regexp insets are matched according to the regular expression matching rules[16], while text entered outside regexp insets is matched exactly against the same text in the document. You can cut and paste regexp-mode insets. Examples of using such a feature may be:

1. Searching for all fractions with a given denominator: for example, entering in the Find editor the fraction $\frac{.*}{1+x^2}$ (where the .* on the numerator is the match-everything regular expression) finds all fractions with the given denominator.

2. Searching for all text with a given style: for example, after checking the Adhere to search string formatting of and the Select all button in this section pressed, entering a .* regular expression and giving it an emphasized or bold face, finds all emphasized or bold face text respectively. Also, by inserting a .* regular expression in a bullet or enumerated list or a section heading, you can find all bullet or enumerated lists or section headings. The meaning of the specific style options (if checked) is as follows:

   Language Allows searching for text in specific language (relevant here is, as with the other options, the setting of the search string)

   Font color colored text like cyan, yellow, etc

   Font family Roman, Sans serif, Typewriter

   Font series e.g. Bold

   Font shape e.g. upright, italic, ...

   Font size e.g. Large, Tiny, ...

   Emph/noun Semantic Markup: Emphasized, Noun

   Underlining e.g. Single, Double, Wawy

   Strike-through Single, With '/'

   Deletion searches also in deleted parts (in case of 'Track Changes' enabled)

   Sectioning markup e.g. title, part, chapter, section, ...

Finally, references to (sub)expressions in regexp may be used as usual: Enclosing parts of the expression within round braces (), and referring back to them through

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[15]A good explanation of regular expressions is given in this Wikipedia entry: https://en.wikipedia.org/wiki/Regular_expression.

[16]Under the constraint that any (sub)expression must match a well-formed LyX segment, i. e. when matching LaTeX code, no segments with unbalanced {} braces are allowed to match expressions.

\1, \2, etc.. For example, try searching with the regexp
\b(\w+)\s\1\b
in order to find word repetitions, if there are any.

The usage of back references in the replaced text is not (yet) fully implemented.

Note: Back references work both when occurring within the same regexp, and when occurring in multiple different regexps, where the numbering of back-referenced sub-expressions is absolute. That is, \1 always refers to the first occurrence of () in all entered regexps.

6.15. Spell Checking

LyX has a built-in spell checker. The menu Tools ▷ Spellchecker, the F7 key or the toolbar button ᴬᵇᶜ start the spell checking from either the current cursor position or the beginning of the currently selected text. A sidebar will appear showing any incorrect (or unknown) word found, allowing you to edit and replace it in a second line. Whenever an unknown word is found, the word is highlighted and the text scrolled so that it is visible. In the spellchecker sidebar, there is a box showing suggestions for a correction, if any could be found. Clicking on one of the corrections will copy it to the Replacement field, double-clicking directly invokes the replacement. Unknown but correctly typed words can be added to the personal dictionary.

By default, the dictionary file used is determined by the document language that is set in the Document ▷ Settings dialog. You can specify the language of a word in the spellchecker dialog by choosing a different one at the top of the dialog. LyX can correctly spell check documents containing multiple languages. This works if you have set the language of the text parts using the Text Style dialog (ᵃᵇᶜ) and have the spell checker dictionaries installed. LyX automatically switches to the appropriate dictionary file.

All spell-checker dictionaries supported by LyX can be downloaded from here:
https://www.lyx.org/trac/export/HEAD/dictionaries/dicts/
You should download 2 files for each language (use *Original Format* link at the end of the opened webpage). To install a dictionary on Windows, copy these 2 files into LyX's installation subfolder ~\Resources\dicts and restart LyX.
With Linux one needs to install the packages for the desired language. The number of these packages vary depending on the Linux distribution, but in most cases these are `aspell-xx`, `hunspell-xx`, `myspell-xx`, etc., where `xx` is the language code.

6.15.1. Further Settings

In the menu Tools ▷ Preferences ▷ Language Settings ▷ Spellchecker you can set the following things:

Spellchecker engine Select the library LʏX should use for spell checking. Depending on your platform, `hunspell` or `enchant`[17] are available. On Windows only `hunspell` is available. LʏX on Mac OS can also use Mac's own spellchecker and will use it by default.

Alternative language If this field is not empty, LʏX will always use the given language for the spell checking, no matter what the document language is.

Escape characters Allows you to add non-standard characters that the spell checker should escape, e. g. German umlauts. This should normally not be needed.

Accept compound words Prevents the spell checker from complaining about compounded words like "passthrough".

Spellcheck continuously Checks the spelling of your document as you type it. Misspelled words get underlined with a dotted red line. By right-clicking on an underlined word, suggestions from the spellchecker appear in a context menu. Choosing one of them will replace the misspelled word with the suggested word.

Spellcheck notes and comments If enabled, the spelling of non-printed document content is checked as well.

6.16. Thesaurus

LʏX provides a multilingual thesaurus. It uses the same thesaurus framework as LibreOffice, OpenOffice and Firefox (namely the MyThes[18] thesaurus library, which is included in LʏX). Therefore, LʏX is able to directly access OpenOffice thesaurus dictionaries, which are available for many languages.

This section describes how new dictionaries are installed and set up for the use with LʏX.

6.16.1. Setting up the thesaurus

The MyThes/OpenOffice thesauri consist of two files per language: A file with the suffix **.dat* containing the data and an index file with the suffix **.idx*. The standardized file names include the language code for the given language (e. g. en_US for US English). For instance, the US English files are named:

- th_en_US_v2.idx

- th_en_US_v2.dat

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[17]Enchant itself is a wrapper library having different configurable back-ends. Please consult the documentation or man-page of it to learn more.

[18]https://lingucomponent.openoffice.org/thesaurus.html

If you have LibreOffice or OpenOffice and its thesaurus installed, these files should be already on your system and you just need to point LyX (in Tools ▷ Preferences ▷ Paths ▷ Thesaurus dictionaries) to the path where they are installed.[19] On Windows, you can alternatively also select dictionaries for installation during the LyX installation process, which will then be installed in the correct place right away.

If you want to install new/updated thesaurus dictionaries, you can download them from here:
<https://www.lyx.org/trac/export/HEAD/lyxsvn/dictionaries/trunk/thes/>

To install a new dictionary, download the two files for this dictionary into the thesaurus path (which is set in Tools ▷ Preferences ▷ Paths ▷ Thesaurus dictionaries) and restart LyX. If this path is not defined yet, you can use a dictionary of your choice and point LyX there.

Alternatively, you can also install new dictionaries via LibreOffice/OpenOffice or, on Linux, via your package manager (look for *mythes-** or *libreoffice-thesaurus-** packages). If you do this, make sure that LyX is able to find the installed dictionaries, i. e. that Tools ▷ Preferences ▷ Paths ▷ Thesaurus dictionaries points to the path where you installed these dictionaries.

6.16.2. Using the thesaurus

To start the thesaurus, use the menu Tools ▷ Thesaurus or the toolbar button 📖 while the cursor is at the word you want to look up or while a word is selected. A dialog pops up showing you probably related words that you can use as a replacement. The suggestions are grouped into categories. Note that, for some languages (such as English), the thesaurus does not only show equivalent words (synonyms), but also generic terms (such as *organism* for *plant*), related terms (such as *political theory* for *anarchistic*), compounds (such as *tree diagram*, if you look for *tree*) and opposites (antonyms) (such as *girl* for *boy*). Generic terms, related terms and antonyms are marked as such.

The language is automatically chosen from the language at the cursor, but you can also switch it in the dialog, as you can enter new words to look up directly there.

Note that the thesaurus cannot handle phrases (only compounds that are in the dictionary, such as the above *tree diagram*), and you have to use the so called lemma form, i. e. the form that is used in the dictionaries (for many languages: first person singular indicative active for nouns, infinitive for verbs). For example, looking up

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[19]On Linux, depending on your distribution and the way you installed the dictionaries, typical locations are `/usr/share/mythes/`, `/usr/share/myspell/dicts/`, `/usr/share/ooo/thesaurus/`, `~/.config/libreoffice/<version>/user/` or alike. On Windows, dictionaries are to be found at `~\Program Files\LibreOffice-<Version>\share\extensions` or similar. On the Mac, the default location is `/Users/<user name>/Library/Application Support/libreoffice/<version>/user/`.

the word form *reporting* yields no results, while results are shown for the word form *report*. Your best bet is to highlight only the relevant part of such a word (e. g. *report* in *report*s); then you will get suggestions without needing to adjust the query in the dialog, and also the replacement will probably be correct (as only the highlighted part will be replaced; thus the ending remains).

6.17. Change Tracking

When you work on a document collaboratively it is extremely useful to be able to see changes that others have made highlighted in the document. You can then decide if you want to accept a change or not. This can be achieved by turning on change tracking in the menu Document ▷ Change Tracking ▷ Track Changes.

Changes made in the document will then be highlighted by strokes and colors: underlined text is an addition, ~~canceled text~~ is a deletion. The color depends on the author that made the change. You can change the color in Tools ▷ Preferences ▷ Look & feel ▷ Colors. The author and the date of the change are shown in LyX's status bar when the cursor is in changed text. The same information is shown when you use the toolbar button.

When change tracking is activated, you will see the review toolbar in LyX:

The review toolbar as shown above contains the following buttons:

	Document ▷ Change Tracking ▷ Track Changes
	Document ▷ Change Tracking ▷ Show Changes in Output
	Jumps to the next change
	Document ▷ Change Tracking ▷ Accept Change
	Document ▷ Change Tracking ▷ Reject Change
	Document ▷ Change Tracking ▷ Merge Changes
	Document ▷ Change Tracking ▷ Accept All Changes
	Document ▷ Change Tracking ▷ Reject All Changes
	Insert ▷ Note ▷ LyX Note
	Navigate ▷ Next Note

Not all changes are (yet) visualized, especially no format changes like from *normal* to *bold* font or *Standard* to *Description* paragraph.

The review toolbar helps you to accept, reject, or merge changes – highlight the change and press one of the desired toolbar buttons. When you merge changes, a window pops up showing you information about the next change after the current cursor position. So you don't need to highlight a certain change. Within the merge window you can decide to accept or reject changes and step to the next change. This way you can jump through all the changes in the document.

The toolbar has two buttons to handle notes because notes are often important to describe a change.

6.18. Comparison of Documents

You can compare two different LyX files via the menu Tools ▷ Compare. The comparison result is a LyX file with change tracking enabled showing the differences. In the comparison dialog you can select from which document LyX should take the document settings for the resulting difference file with the option Copy Document Settings from. The option Enable change tracking features in the output enables the change tracking option Show Changes in Output to visualize the differences also in the PDF output of the difference file.

6.19. International Support

This section describes how to use LyX with any language you want. For some languages there are special Wiki-pages that explain how to set up LyX to use them: [24, 25, 26, 27, 28, 29]

Besides languages, LyX also supports phonetic symbols, see section A.4.2.

6.19.1. Language Options

The Document ▷ Settings ▷ Language dialog lets you set the language, the quote style and character encoding.

Under Encoding you can choose the character encoding map you want to use for LaTeX export. The option Language Default is the preferred choice and works well in most cases. For details about the different encoding options see section B.9.

6.19.2. Keyboard mapping configuration

If you have for example a U.S.-style keyboard and want to write in a language other than English, you can use an alternate keymap. For example, if you want to write in Italian, you can configure LyX to use an Italian keymap. The Tools ▷ Preferences ▷ Editing ▷ Keyboard/Mouse dialog allows you to choose up to two keyboard mappings, see section C.2.3. You can choose primary and secondary keyboard languages and then select which one you want to use.

Finally, you may just want to change a few key mappings or create an entirely different keymap (for Vulcan, for instance). You may, for example, normally write in Italian on a U.S.-style keyboard but want to include an occasional quotation in German. In such a case, you can write your own keyboard mapping or modify an existing one to support the characters you want. This and many other customizations are explained in the *Customization* manual.

A. The User Interface

This appendix lists all the available menus and describes their functionality. It is designed as a quick reference if you are searching for a special topic inside the user's guide.

A.1. The File Menu

Under the File menu are the basic operations in addition to some more advanced operations.

A.1.1. New

Creates a new document.

A.1.2. New from Template

This menu entry prompts you for a template to use. Selecting a template will automatically set certain layout features for the document, features you would otherwise need to change manually. Furthermore, templates can provide text structures and fragments for recurring writing tasks.

A.1.3. Open

Opens a document.

A.1.4. Open Recent

The submenu shows a list of the recently opened files. Click there on a file to open it.

A.1.5. Open Example

This menu entry gives you quick access to all LyX example files.

A.1.6. Close

Closes the current document.

A.1.7. Close All

Closes all opened documents.

A.1.8. Save

Saves the actual document.

A.1.9. Save As

Saves the actual document under a new name to create a copy.

A.1.10. Save As Template

Saves the document in the appropriate templates directory for later use as a template.

A.1.11. Save All

Saves all opened documents.

A.1.12. Revert to saved

Reloads the actual document from disk.

A.1.13. Version Control

This is used when multiple people are working on the same document or when one person wants to keep a careful archive of changes. It is described in the section *Version Control in LyX* of the *Additional Features* manual.

A.1.14. Import

Here you can import files from older LyX versions, HTML files, LaTeX files, NoWeb files, plain text files and comma separated, table-like text files (CSV). The files will be imported as a new LyX document.

When using the menu entry Plain text, line breaks in the text will start a new paragraph; when using the menu entry Plain Text, Join Lines, consecutive lines of text will be imported to one big paragraph. A new paragraph will begin when there is a blank line in the file.

A.1.15. Export

You can export your document to various file formats. The resulting files are placed in the directory of your LyX file. The menu entries are not the same on all installations. They depend on the programs found by LyX during its configuration.

Here is a list of all available entries; some of them are explained in detail in section 3.8.2:

CJK LyX format of the special LyX 1.4.x versions for Chinese, Japanese and Korean (CJK)
Since LyX 1.5.0 CJK support has been fully integrated into LyX.

DocBook text file with code in the language SGML that is used for the markup language `DocBook`

DocBook (XML) text file with code in the language XML that is used for the markup language `DocBook`

DraftDVI LaTeX's native DVI-format. This format is not suitable if you have special characters or spaces in files paths or file names in your document. LyX use this format internally as a pre-stage to export to DVI.

DVI DVI-format that also allows the usage of special characters or spaces in files paths or file names

DVI (LuaTeX) DVI-format using the program LuaTeX; supports Unicode and the usage of non-TeX fonts; **Note:** not all DVI-viewers are currently able to display this output format properly.

EPS (cropped) the same as PostScript but with cropped page margins.

Graphviz Dot text file with code in the programming language `Dot` which is used to draw visualizations of graphs via the program `Graphviz`

HTML HTML-format; **Note:** the exported file will be stored in a subdirectory.

HTML (MS Word) HTML-format specialized so that the result can be imported to MS Word; as a consequence of this formulas will be embedded as bitmap fonts and not in the format MathML.

LaTeX (LuaTeX) text file with the LaTeX source that is compilable with the program LuaTeX

LaTeX (pdflatex) text file with the LaTeX source, additionally all images used in the document will be converted to a format that is readable by the `pdflatex` program (GIF, JPG, PDF, PNG)

LaTeX (plain) text file with the LaTeX source code, additionally all images used in the document will be converted to the EPS-format, only this format is readable by the `latex` program

LaTeX (XeTeX) text file with the LaTeX source that is compilable with the program XeTeX

LilyPond book (LaTeX) text file with the LaTeX source and also code in the syntax of the music notation software `LilyPond`

LyX z.y.x LyX-Document in a format readable by the LyX versions z.y.x (e. g. "LyX 2.1.x"; "z" and "y" represent the version number)

LyX Archive (zip|tar.gz) creates a zip-archive or a tar.gz-archive file (depending upon your system) that contains your document and all files that are necessary to compile it (images, child documents, BibTeX files, etc.)

LyXHTML HTML-format using LyX's internal XHTML engine

MS Word Office Open XML Office Open XML file, to be opened with Microsoft Word. For the conversion the program `Pandoc` is used. `Pandoc` is a third-party product and may not work in all cases.

NoWeb text file with code in the format of the literate programming language `NoWeb`

OpenDocument (Pandoc) OpenDocument file, to be opened with LibreOffice, OpenOffice, KOffice, Abiword, etc.. For the conversion the program `Pandoc` is used. `Pandoc` is a third-party product and may not work in all cases.

OpenDocument (tex4ht) OpenDocument file. For the conversion the program `tex4ht` is used. `tex4ht` is a third-party product and may not work in all cases.

PDF (cropped) the same as PDF (`pdflatex`) but with cropped page margins

PDF (dvipdfm) PDF-format using the program `dvipdfm`, produces internally a DVI-file which is then converted to a PDF-file

PDF (lower resolution) the same as PDF (`pdflatex`) but with a reduced pixel resolution of 150 dpi (e.g. useful for e-books to be read on tablet PCs or for large documents as intermediate preview)

PDF (LuaTeX) PDF-format using the program LuaTeX, produces PDF-files directly

PDF (pdflatex) PDF-format using the program `pdflatex`, produces PDF-files directly

PDF (ps2pdf) PDF-format using the program `ps2pdf`, produces internally a PostScript-file which is then converted to a PDF-file

PDF (XeTeX) PDF-format using the program XeTeX, produces PDF-files directly

Plain text text format

Plain text (ps2ascii) text format, the document will first be converted to Postscript format and then exported as text using the program ps2ascii

Postscript PostScript format using the program dvips; for possible dvips options see section C.6.1

Sweave text file with the LaTeX source and also code in the statistical programming language R. Using the R-function Sweave it is possible to use R-commands in LaTeX

If one of the menu entries DVI, PDF (pdflatex) or Postscript is missing, you need to update your LaTeX installation. After updating you have to reconfigure LyX, see section 1.4.

A.1.16. Fax

This menu entry will only appear if you have a fax program installed (on Windows you additionally need to register its program path to LyX's PATH prefix, see section C.3). With this menu entry you can send your document to a fax program like hylapex or kdeprintfax. The default format of the sent file is PostScript. The format can be changed in LyX's preferences as described in section C.7.1.

A.1.17. New and Close Window

Opens or closes a new instance of LyX.

A.1.18. Exit

Prompts you to save all unsaved documents and then exits.

A.2. The Edit Menu

A.2.1. Undo and Redo

Described in section 2.4.

A.2.2. Cut, Copy, Paste, Paste Recent, Paste Special

Described in section 2.3.

A.2.3. Select Whole Inset

Selects the content of the inset in which the cursor currently is. If the cursor is outside an inset, the whole document will be selected.

A.2.4. Select All

Selects the whole document.

A.2.5. Find & Replace (Quick)

Described in section 2.3.

A.2.6. Find & Replace (Advanced)

Described in section 6.14.

A.2.7. Move Paragraph Up/Down

This shifts the paragraph in which the cursor currently is one paragraph up or down.

A.2.8. Paragraph Settings

Enables you to set the paragraph alignment, line spacing and label width. These settings only affect the paragraph in which the cursor is currently in.

You can also prevent the first line of the paragraph being indented if you have chosen to separate paragraphs with Indentation in the Document ▷ Settings ▷ Text Layout dialog.

A.2.9. Text Properties

This sub-menu provides several ways to customize the appearance of text passages. You can

1. Customize text properties by means of the Text Properties dialog (via Customize. . . ; this is described in section 3.7.6)

2. Apply the last settings done in this dialog via Apply last settings

3. Change the casing of selected text (Capitalize, Uppercase, Lowercase)

A.2.10. Custom Text Styles

This sub-menu only appears if the document class or a module provides custom text styles (in the case of this document: Code, Emph, Noun and Strong, provided by the Logical Markup module). See section 3.7.5.2 for details.

A.2.11. Table and Rows & Columns

These menus only appear if the cursor is inside a table. It allows you to create multicolumn and multirow cells, add or remove borders of a cell and to set the alignment of the cell.

A.2.12. Dissolve Inset

This menu only appears if the cursor is inside an inset. It will dissolve this inset. This means that the inset is deleted and its content is left as normal text.

A.2.13. Settings or Math

This menu is only active if the cursor is inside an inset or a formula. Here you can change the properties of the inset or the formula.

A.2.14. Increase/Decrease List Depth

These menus are only active if the cursor is in an environment that can be nested. They increase/decrease the environment nesting level as explained in section 3.4 and 3.3.4.3.

A.3. The View Menu

At the bottom of the View menu the opened documents are listed.

A.3.1. Open/Close all Insets

Opens/closes all insets in your document.

A.3.2. Unfold/Fold Math Macros

Unfolds/folds the current math macro.

Math macros are described in the *Math* manual.

A.3.3. Outline Pane

Shows the outline window as described in sections 2.6 and 6.2.1.

A.3.4. Source Pane

Opens a window showing the source code of the actual document, as described in section 6.13.

A.3.5. Messages Pane

Opens a window showing console messages. This is useful for debugging LyX (i. e., hunt for errors in the program) or to see what is going on in the background while LaTeX is processing the document.

A.3.6. Toolbars

In this menu entry you can set the icon size and the appearance of the different toolbars. All toolbars and the Command Buffer can be turned *on* and *off*. The *on* state is denoted in the menu with a checkmark.

The Phonetic Symbols, Table, Math, Math Macros, Review and Math Panels toolbars can additionally be set to the state *automatic*. The state of these toolbars is set and indicated in a submenu which lets you select On, Off, and Automatic.

In the *on* state the toolbar is permanently shown, in the *off* state it is never shown; in the *automatic* state the toolbar is only shown when the cursor is in a certain environment or when a certain feature is enabled. That means that the review toolbar will only be shown if change tracking is activated, the math and table toolbars are only shown if the cursor is inside a formula or table respectively, the phonetic symbols toolbar only in the phonetic symbols environment.

LyX's toolbars and their buttons are explained in section A.9.

A.3.7. Split View

Split View into Left and Right Half will split LyX's main window vertically while Split View into Upper and Lower Half will split it horizontally. This allows you to view documents at the same time to compare them, or to view the same document, but at different positions. You can even split the main window several times to view, for example, three or more documents at the same time. To close a split view, use the menu Close Current View.

A.3.8. Close Current View

Closes a split view.

A.3.9. Fullscreen

Using this menu entry or pressing F11 removes the menu bar and all toolbars so that you will see nothing but your text. It furthermore displays LyX's main window fullscreen. To return from fullscreen to the normal view, press F11, or right-click and turn off the fullscreen mode in the context menu.

A.4. The Insert Menu

A.4.1. Math

Inserts math constructs that are explained in chapter 5 and the *Math* manual.

A.4.2. Special Character

Here you can insert the following characters:

Symbols Opens the Symbols dialog which allows you to insert any character that can be output by your LaTeX system. By default groups of characters are displayed in character categories; the available characters depend on the LaTeX-packages you have installed. You can get a complete display by checking Display all.
Note: Not all characters will be visible in the Symbols dialog because none of the screen fonts that you can set in the preferences dialog (see section C.1.3) can display every character.

Ellipsis Inserts an ellipsis: . . .

End of Sentence Inserts an end of sentence period as described in section 3.9.4.1.

Ordinary Quote Inserts this quote: ", no matter what quote style you selected in the Document ▷ Settings ▷ Language dialog.

Single Quote Inserts a single quote in the quotation marks style selected in the Document ▷ Settings ▷ Language dialog.

Non-Breaking Hyphen Inserts a hyphen that prevents automatic line breaks: -

Breakable Slash Inserts a slash where a line break can also occur: /

Visible Space Inserts a character to visualize that there is or should be a space. This is e. g. useful if you need to indicate a space in a command sequence. An

example from the LyX *Math* manual: "To insert a fraction use the command **\frac␣A↓B.**" The visible space is hereby the character before the **A**.

Menu Separator Inserts the menu separator sign: ▷

Phonetic Symbols Inserts a box where you can insert symbols from the International Phonetic Alphabet (IPA) and opens a toolbar which provides a large set of these symbols. To use this feature you must have the LaTeX-package **tipa** installed. More information about this feature can be found in the *Linguistics* manual (Help ▷ Specific Manuals).

Logos Inserts the logos of the programs LyX, TeX, LaTeX and LaTeX 2_ε.

A.4.3. Formatting

Opens a submenu with the following options:

Superscript Inserts a superscript: test[a, b]

Subscript Inserts a subscript: test$_{3x}$

Non-Breaking Space Inserts a non-breaking space as described in section 3.5.1.

Interword Space Inserts an inter-word space as described in section 3.5.2.1.

Thin Space Inserts a thin space as described in section 3.5.2.2.

Horizontal Space Inserts horizontal space as described in section 3.5.2.

Horizontal Line Inserts a horizontal line as described in section 3.5.7.

Vertical Space Inserts vertical space as described in section 3.5.3.

Phantom Inserts a Phantom space as described in section 3.5.2.5.

Hyphenation Point Inserts a hyphenation point as described in section 3.9.3.

Ligature Break Inserts a ligature break as described in section 3.9.5.

Optional Line Break Inserts a line break point (zero-width space character) that is invisible in the output. See section 3.9.2 for a usage example.

Ragged Line Break Inserts a forced line break as described in section 3.5.6.

Justified Break Inserts a forced line break that justifies the remaining text as described in section 3.5.6.

New Page Inserts a forced page break as described in section 3.5.5.

Page Break Inserts a forced page break that shares the extra space among paragraph breaks instead of leaving it at the bottom of the page, as described in section 3.5.5.

Prevent Page Break Instructs LaTeX to prevent a page break at the given position. See section 3.5.5.2.

Clear Page Inserts a clear page break as described in section 3.5.5.1.

Clear Double Page Inserts a clear doublepage break as described in section 3.5.5.1.

A.4.4. Field

Here you can insert fields holding specific information. The submenu allows you to insert

Date (Current) inserts the current date (which will automatically update itself)

Date (Last Modification) inserts the date of the last file modification (time of last save)

Date (Fix) inserts a static date that will not change.

Time (Current) inserts the current time (which will automatically update itself)

Time (Last Modification) inserts the time of the last file modification (time of last save)

Time (Fix) inserts a static time that will not change.

File Name (Excl. Extension) inserts the name of the current file (without the extension .lyx)

Version Control Revision inserts the version control reference number (e.g. git commit hash). This submenu does not appear if the file is not under version control

User Name inserts the user name as specified in Tools ▷ Preferences ▷ Identity.

User Email inserts the user email address as specified in Tools ▷ Preferences ▷ Identity.

Other. . . opens a dialog that lets you insert alternative formats of the three date types listed above and insert a range of other information.

A.4.5. List/Contents/References

Various lists can be inserted with this menu entry. The Table of Contents, the List of Algorithms, List of Figures, List of Tables and List of Listings are described in section 6.2. The Index List is described in section 6.7, the Nomenclature is described in section 6.8 and the BibTeX Bibliography is described in section 6.6.2.

A.4.6. Float

To insert floats, as described in section 4.6 and in detail the chapter *Floats* of the *Embedded Objects* manual.

A.4.7. Note

To insert notes, described in section 4.1.

A.4.8. Branch

Inserts a branch inset, if any, and allowing you to create and insert a new branch. Branches are described in section 6.9.

A.4.9. Custom Insets

Inserts document class-specific insets. Such insets only exist if they are defined in the layout file for a certain document class. An example is the document class *Elsevier* with three custom insets. The section *Flex insets and InsetLayout* in *Installing New Document Classes, The Layout file format* of the *Customization* manual explains how custom insets are defined.

A.4.10. File

This menu entry allows you to insert or include the contents of other files in your document. For more information see chapter *External Document Parts* of the Embedded Objects manual.

A.4.11. Box

Inserts a box in a certain style. Boxes are described in detail in the chapter *Boxes* of the *Embedded Objects* manual.

A.4.12. Citation

Opens the Citation dialog as described in section 6.6.

A.4.13. Cross-Reference

Inserts a cross-reference as described in section 6.1.

A.4.14. Label

Inserts a label as described in section 6.1.

A.4.15. Caption

Inserts a caption in a float or multi-page table. Floats are described in section 4.6; captions in multi-page tables are described in the section *Multi-page Table Captions* of the *Embedded Objects* manual.

A.4.16. Index Entry

Inserts an index entry as described in section 6.7.

A.4.17. Nomenclature Entry

Inserts a nomenclature entry as described in section 6.8.

A.4.18. Table

Opens a dialog allowing you to specify the rows and columns of the table. Tables are described in section 4.5 and in detail in the chapter *Tables* of the *Embedded Objects* manual.

A.4.19. Graphics

Opens the Graphics dialog. Graphics are described in section 4.4.

A.4.20. URL

Inserts a URL as described in section 6.3.1.

A.4.21. Hyperlink

Inserts a hyperlink as described in section 6.3.2.

A.4.22. Footnote

Inserts a footnote as described in section 4.2.

A.4.23. Marginal Note

Inserts a marginal note as described in section 4.3.

A.4.24. Separate <Name> (Above/Below)

These menu items are only visible if it is possible to have two consecutive environments of the same type. See section 3.4.6 for an explanation.

A.4.25. Short Title

Is only visible if the cursor is in front, in or behind a section heading, title or caption of a float. Inserts a short title as described in section 3.3.4.4.

A.4.26. TeX Code

Inserts a TeX Code box as described in section 6.11.1.

A.4.27. Program Listing

Inserts a program listings box. Program listings are explained in the chapter *Program Code Listings* of the *Embedded Objects* manual.

A.4.28. Preview

Inserts a preview inset as described in section 6.13.

A.5. The Navigate Menu

This menu lists the existing chapters, sections, figures, tables, etc. of the current document. This allows you to navigate easily through your document.

A.5.1. Bookmarks

With this menu entry you are able to define your own bookmarks. This is useful when you are working on a large document and often have to jump, for example, between section 2.5 and 6.3. To create bookmarks for this example, go to section 2.5 and use the submenu Save Bookmark 1. Then go to section 6.3 and use Save Bookmark 2. Now you can jump easily between these sections by using the menu or by the key bindings Ctrl+1 and Ctrl+2.You can also use bookmarks to jump between several opened documents.

The submenu Clear Bookmarks allows you to clear bookmarks while the submenu Navigate Back jumps to the position in the document where you recently changed something.

A.5.2. Next Note, Change, Cross-reference

Jump to the next note, change, or cross-reference after the current cursor position.

A.5.3. Go to Label

Only active if the cursor is in front of a cross-reference. Sets the cursor before the referenced label. (It is the same as if you right-click on a cross-reference box and use Go to Label).

A.5.4. Forward Search

Allows you to jump directly to the corresponding text part in the output, see section *The LyX Server ▷ Forward search* in the *Additional Features* manual for a detailed description.

A.6. The Document Menu

A.6.1. Change Tracking

Change Tracking is described in section 6.17.

A.6.2. LaTeX Log

After running LaTeX by viewing or exporting a document, this menu will be enabled. It shows the logfile of the LaTeX-program used. You can go to the next error or the next warning, search, copy something to the clipboard or update the view.
With the help of the logfile, experts can find reasons for LaTeX-errors.

With the button Open Containing Directory one can open LyX's temporary folder for the document. This folder contains all converted and created files to generate the output. Some of these files might be of interest for experts to solve problems or for writers who need to supply intermediate files. For example some journals require to send the *.bbl file (a text file with the used BibTeX references).

A.6.3. Start Appendix Here

Sets the start of the appendices of the document at the current cursor position as described in section 6.5.

A.6.4. View [<output format>]

This menu entry generates the output in the format you have specified as default output format for the document (menu Document ▷ Settings ▷ Output ▷ Default Output Format; see section B.21) or in the LyX preferences (menu Tools ▷ Preferences ▷ File Handling ▷ File Formats ▷ Default Output Format; see section C.7.2) and opens it in an appropriate viewer. The viewer can be set or changed in the preferences (menu Tools ▷ Preferences ▷ File Handling ▷ File Formats ▷ Viewer; see section C.7.2). The default viewers are set by LyX when it is first configured. The default output format is PDF (pdflatex).

A.6.5. View (Other Formats)

With this menu you can view your document in alternative output formats. The menu contains a list of available formats in which you can view the actual document with an external program. The menu entries are not the same on all installations — it depends on the LaTeX programs that are found when LyX was configured. All possible formats are listed in section A.1.15. You should at least see the menu entry DVI. If it is missing, you need to update or repair your LaTeX installation. After updating you have to reconfigure LyX (see section 1.4.)

Invoking a view menu will start a viewer program. The viewer can be set or changed in the preferences (menu Tools ▷ Preferences ▷ File Handling ▷ File Formats ▷ Viewer; see section C.7.2). The default viewers are set by LyX when it is first configured.

A.6.6. Update [<output format>]

This menu entry allows you to update the view with your latest changes (in the default output format) without opening a new viewer window.

A.6.7. Update (Other Formats)

With this menu you can update the view of alternative output formats of your document without opening a new viewer window.

A.6.8. View Master Document

This menu item is only visible if your document is included to another document, which is then its "master" (see section *Child Documents* in the *Embedded Objects* manual for more information on this topic). This item allows you to view the master document from within its child. That is, if you are working on a child document which is a chapter of a book, View Master Document generates the output of the whole book, while View will just output the chapter alone.

The format used by this function is the default output format as specified in the document settings (menu Document ▷ Settings ▷ Output ▷ Default Output Format; see section B.21) or in the preferences (menu Tools ▷ Preferences ▷ File Handling ▷ File Formats ▷ Default Output Format; see section C.7.2).

A.6.9. Update Master Document

This menu item is only visible if your document is included to another document, which is then its "master" (see section *Child Documents* in the *Embedded Objects* manual for more information on this topic). This item allows you to update the view of a master document from within its child without the need to switch to the master document itself.

The format used by this function is the default output format as specified in the document settings (menu Document ▷ Settings ▷ Output ▷ Default Output Format; see section B.21) or in the preferences (menu Tools ▷ Preferences ▷ File Handling ▷ File Formats ▷ Default Output Format; see section C.7.2).

A.6.10. Compressed

Un/compresses the current document. For documents under version control it is strongly recommended to disable compression (see the *Additional Features* manual for details).

A.6.11. Disable Editing

Toggles the read-only state for the document.

A.6.12. Settings

The document settings are described in appendix B.

A.7. The Tools Menu

A.7.1. Spellchecker

Spell checking is explained in section 6.15.

A.7.2. Thesaurus

The thesaurus is described in section 6.16.

A.7.3. Statistics

Returns the number of the words and characters in the actual document or the highlighted document part.

A.7.4. Check TeX

Generates with the help of the program ChkTeX a log of possible LaTeX-errors and displays it in a dialog. This feature is not available on Windows.

A.7.5. TeX Information

Shows you a list of the document classes and styles installed in your LaTeX-system. Use the option Show path to see the full filename paths.

A.7.6. Compare

Opens a dialog to compare LyX files as described in section 6.18.

A.7.7. Reconfigure

Reconfigures LyX; that is, LyX looks for LaTeX-packages and programs it needs; see also section 1.4.

A.7.8. Preferences

Opens the Preferences dialog as described in detail in appendix C.

A.8. The Help Menu

This menu lists the documentation files of LyX in the language of LyX's menus. If a file is not available in this language, the English version will be listed.

The menu LaTeX Configuration shows a LyX document with information about the LaTeX packages and classes found by LyX (see also section 1.5).

The menu About LyX gives information about the copyright, the credits and the LyX version you are using.

A.9. Toolbars
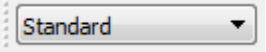
How to show or hide toolbars is explained in section A.3.6.

It is also possible to define custom toolbars. This is described in the *Additional Features* manual.

A.9.1. Standard Toolbar

The standard toolbar as shown above contains from left to right the following buttons:

 pull-down box for the environments

File ▷ New

File ▷ Open

File ▷ Save

Tools ▷ Spellchecker

Spellcheck continuously

Edit ▷ Undo

Edit ▷ Redo

Edit ▷ Cut

Edit ▷ Copy

Edit ▷ Paste or Edit ▷ Paste Recent

Edit ▷ Find & Replace (Quick)

Q Edit ▷ Find & Replace (Advanced)

⇐ Navigate ▷ Bookmarks ▷ Navigate Back

Emphasize text, function of the Édition ▷ Propriétés du texte ▷ Personnaliser... dialog

Set text to noun style, function of the Édition ▷ Propriétés du texte ▷ Personnaliser... dialog

Edit ▷ Custom Text Styles

Σ Insert ▷ Math ▷ Inline Formula

Insert ▷ Graphics

Insert ▷ Table

Insert ▷ Custom Insets

Toggle outline window on/off, View ▷ Outline

Toggle math toolbar on/off

Toggle table toolbar on/off

A.9.2. Extra Toolbar

The extra toolbar as shown above contains from left to right the following buttons:

Default

Numbered list

Itemized list

List

Description list

Edit ▷ Increase List Depth

Edit ▷ Decrease List Depth

Insert ▷ Float ▷ Figure

Insert ▷ Float ▷ Table

Insert ▷ Label

Insert ▷ Cross-Reference

Insert ▷ Citation

Insert ▷ Index Entry

Insert ▷ Nomenclature Entry

Insert ▷ Footnote

Insert ▷ Marginal Note

Insert ▷ Note ▷ LyX Note

Insert ▷ Box

Insert ▷ Hyperlink

Insert ▷ TeX Code

Insert ▷ Math ▷ Macro

Insert ▷ File ▷ Child Document

Edit ▷ Text Style ▷ Customized

Format text using the recent settings in the Édition ▷ Propriétés du texte ▷ Personnaliser… dialog

Edit ▷ Paragraph Settings

Tools ▷ Thesaurus

A.9.3. View/Update Toolbar

The view/update toolbar as shown above contains from left to right the following buttons:

Document ▷ View

Document ▷ Update

🔳	Document ▷ View Master Document
🔳	Document ▷ Update Master Document
🔳	Document ▷ Settings ▷ Formats ▷ Synchronize with Output
🔳	Document ▷ View (Other Formats)
🔳	Document ▷ Update (Other Formats)

A.9.4. Other Toolbars

The change tracking toolbar is explained in section 6.17, the table toolbar in the *Embedded Objects* manual and the math macro toolbar in the *Math* manual.

B. The Document Settings

The Document Settings dialog contains submenus to set properties for the whole document and is called with the menu Document ▷ Settings. You can save your document settings as default with the Save as Document Defaults button in any dialog. This will create a template named `defaults.lyx` which is automatically loaded by LyX when you create a new document without using a template.

The button Use Class Defaults resets the document settings to the default of the document class. This affects mostly class options, the page layout and Numbering & TOC.

The different submenus of the dialog are explained in the following sections. There are so many document settings available that it might take a while to find the one you are looking for. To find a setting quicker, you can use the search field which is above the submenus of the dialog. If you search e.g. for "page", you will see that some submenus will be grayed-out and disabled. Only the submenus with page settings stay enabled. The found page settings are labeled red in these submenus.

B.1. Document Class

Here you set the document class, class options, a graphics driver, and a master document. Document classes are described in section 3.1.2.

With the button Local Layout you can load you own layout-file, that is not in LyX's *layouts* folder and thus not recognized by LyX as a layout for a document class. For more about layout-files, see the chapter *Installing New Document Classes, Types of Layout Files* of the *Customization* Handbook.

Some classes use special class options by default. If this is the case, they are listed in the field Predefined and you can decide to use them or not. If you do not know exactly what the default class options are for, it is recommended you leave them untouched. The Graphics driver is used for LaTeX's graphics, color and page layout packages. If using Default, the default driver for the LaTeX-packages is used. It is recommended that you use the default unless you know what you are doing.[1]

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[1]When you want to use one of the following drivers
  dvi2ps, dvialw, dvilaser, dvitops, psprint, pubps, ln
  you first have to activate them in your LaTeX distribution, see section *Driver support* in https://www.ctan.org/tex-archive/macros/latex/required/graphics/grfguide.pdf.

Specifying a Master document is necessary if the current document is a child or subdocument. The master document will be used by LyX in the background if the child document is opened without its master. This way child documents are always compilable. More about master and child documents is explained in the section *Child Documents* of the *Embedded Objects* manual.

There is also an option to suppress the date and one to use the LaTeX-package **refstyle** instead of **prettyref** for cross-references, see section 6.1.

B.2. Child Documents

This submenu is only visible when your document includes child documents. Please refer to the section *Child Documents* of the *Embedded Objects* manual for details.

B.3. Modules

Modules are explained in section 3.1.2.3.

B.4. Local Layout

See section 3.1.2.4 for a description.

B.5. Fonts

The document font settings are described in section 3.7.

B.6. Text Layout

You can specify if paragraphs should be separated by Indentation or by Vertical space. The Line spacing and whether it should be a Two-column document can also be specified here.

Note that LyX will not show two columns or the specified line spacing on screen. That would be impractical, often unreadable, and is not part of the WYSIWYM concept. However, it will be as you specified in the output.

With the option Use justification in LyX work area you can decide if LyX justifies the text on screen. This only affects the text inside LyX not in the output.

The Default Style setting in Table Style lets you select which style newly inserted tables should use by default.

B.7. Page Layout

This dialog is described in sections 3.1.4 and 3.1.3.

B.8. Page Margins

Here you can adjust the page margins as described in section 3.1.5.

B.9. Language

The document language and quote styles are set here. The encoding specifies how the document content is exported to LaTeX (the LyX file is always encoded in utf8). All characters that cannot be encoded using the specified encoding will be exported as LaTeX-commands (this can fail if a LaTeX-command is not known for a particular character).

By default, LyX outputs LaTeX files in Unicode – or utf8, for that matter (which is nowadays also LaTeX's default encoding). This should normally fit your needs, since LaTeX's Unicode support covers the characters of most scripts. Nonetheless it is not yet comprehensive, so there might be cases where using one of the traditional, or "legacy", encodings is necessary.

LyX provides support for these traditional encodings. If you chose Traditional (auto-selected) from the Encodings dropdown, LyX automatically selects the appropriate traditional encoding for the given language(s).If the document contains text in more than one language you thus may get more than one encoding in the LaTeX file.

Finally, you can also select Custom, which lets you specify a specific (single) encoding for the whole document. Note that this encoding is then used for *any* language. The custom list (which is spelled out below) consists of traditional encodings and some special cases of Unicode for specific purposes (see explanation below).

The ...(no inputenc) selection in the next dropdown menu does what it states: it prevents LyX from automatically loading the LaTeX-package **inputenc**. This option might be useful if you use a class or package that pre-loads inputenc or if inputenc must not be used for some reason. When using this, you probably need to load some additional packages manually in the preamble and specify the used encoding for text parts in foreign languages in TeX code. Note that this option is only available for the standard Unicode and Traditional (auto-selected) encodings.

B. The Document Settings

The Language package determines the LaTeX-package that is used for hyphenation and the translation of strings like "Part". The possible settings are:

Default uses the language package that is selected in Tools ▷ Preferences ▷ Language Settings (see section C.5.1).

Automatic selects the most suitable language package for the view/export format you will use. In many cases this will be **babel**. If the newer package **polyglossia** is more appropriate (is the case when using XeTeX or LuaTeX and non-TeX fonts), this package will be used instead of **babel**.

Always Babel uses **babel** even if **polyglossia** would be more appropriate.

Custom allows you to specify a language package command of your choice. For example if you want to use a language-specific package like **ngerman** (for German texts), type in
\usepackage{ngerman}

None will not use a language package. This is necessary for some document classes for scientific articles.

Here is a list with the important encodings:

ASCII the ASCII encoding, covers only plain English (7-bit ASCII). LyX converts all other characters into LaTeX commands, which may result in a big file when lots of LaTeX-commands are needed.

Arabic (CP 1256) MS Windows code page for Arabic and Farsi

Arabic (ISO 8859-6) for Arabic and Farsi

Armenian (ArmSCII8) for Armenian

Baltic (CP 1257) MS Windows code page for Estonian, Latvian and Lithuanian, the same as the ISO-8859-13 encoding

Baltic (ISO 8859-13) for Estonian, Latvian and Lithuanian, a superset of the ISO-8859-4 encoding

Baltic (ISO 8859-4) (latin 4) for Estonian, Latvian and Lithuanian, a subset of the ISO-8859-13 encoding

Central European (CP 1250) MS Windows code page for ISO 8859-2 (latin2)

Central European (ISO 8859-2) (latin 2) covers Albanian, Croatian, Czech, German, Hungarian, Polish, Romanian, Slovak and Slovenian

Chinese (simplified) (EUC-CN) for simplified Chinese, used especially on UNIX OSes, since 2001 this encoding is officially replaced by the encoding GB18030, as GB18030 is not available for LaTeX you should try to use the encoding Unicode (CJK) (utf8)

Chinese (simplified) (GBK) for simplified Chinese, is the same as the Windows code page CP 936 except for the Euro currency sign, since 2001 this encoding is officially replaced by the encoding GB18030, as GB18030 is not available for LaTeX you should try to use the encoding Unicode (CJK) (utf8)

Chinese (traditional) (EUC-TW) for traditional Chinese

Cyrillic (CP 1251) MS Windows code page for Cyrillic

Cyrillic (ISO 8859-5) covers Belorussian, Bulgarian, Macedonian, Serbian and Ukrainian

Cyrillic (KOI8-R) standard Cyrillic especially for Russian

Cyrillic (KOI8-U) Cyrillic for Ukrainian

Cyrillic (pt 154) Cyrillic for Kazakh

Greek (ISO 8859-7) for Greek

Hebrew (CP 1255) MS Windows code page for Hebrew, a superset of the ISO-8859-8 encoding

Hebrew (ISO 8859-8) for Hebrew

Japanese (CJK) (EUC-JP) EUC-JP encoding for Japanese, uses the LaTeX-package **CJK**, when using this, set the document language to Japanese (CJK)

Japanese (CJK) (JIS) JIS encoding for Japanese, uses the LaTeX-package **CJK**, when using this, set the document language to Japanese (CJK)

Japanese (non-CJK) (EUC-JP) EUC-JP encoding for Japanese, uses the LaTeX-package **japanese**, when using this, set the document language to Japanese

Japanese (non-CJK) (JIS) JIS encoding for Japanese, uses the LaTeX-package **japanese**, when using this, set the document language to Japanese

Japanese (non-CJK) (SJIS) SJIS encoding for Japanese, uses the LaTeX-package **japanese**, when using this, set the document language to Japanese

Korean (EUC-KR) for Korean

Southern European (ISO 8859-3) (latin 3) covers Esperanto, Galician, Maltese and Turkish

South-Eastern European (ISO 8859-16) (latin 10) covers Albanian, Croatian, Finnish, French, German, Hungarian, Irish Gaelic, Italian, Polish, Romanian and Slovenian, is designed to cover many languages and characters with diacritics

Thai (TIS 620-0) for Thai

Turkish (ISO 8859-9) (latin 5) for Turkish, is like the ISO-8859-1 encoding where the Icelandic letters are replaced by Turkish ones

Unicode (CJK) (utf8) Unicode utf8 with the LATEX-package **CJK** (for the languages Chinese, Japanese and Korean). This encoding is selected by LyX with the default encoding (Unicode (utf8) [default] in the main Encoding dropdown list) with CJK languages. Normally you do not need to set this encoding manually.

Unicode (XeTeX) (utf8) Unicode utf8 to be used with XeTEX and LuaTEX, which use Unicode directly, without the help of the LATEX-package **inputenc**. LyX automatically selects this encoding if you export or preview XeTEX or LuaTEX. Normally you do not need to set this encoding manually.

Unicode (ucs-extended) (utf8x) Unicode utf8 based on the LATEX-package **ucs** (including Latin, Greek, Cyrillic and CJK scripts). This used to be more comprehensive than Unicode (utf8), but meanwhile it is rather outdated.

Unicode (utf8) Unicode utf8 based on the LATEX-package **inputenc**. This encoding is selected by LyX with the default encoding (Unicode (utf8) [default] in the main Encoding dropdown list) with non-CJK languages. Normally you do not need to set this encoding manually.

Western European (CP 1252) MS Windows code page for ISO 8859-1 (latin1)

Western European (ISO 8859-1) (latin 1) covers the languages Albanian, Catalan, Danish, Dutch, English, Faroese, Finnish, French, Galician, German, Icelandic, Irish, Italian, Norwegian, Portuguese, Spanish and Swedish; better use the ISO-8859-15 encoding instead

Western European (ISO 8859-15) (latin 9) like the ISO-8859-1 encoding, but with the Euro currency sign, the œ-ligature and some characters used for French and Finnish

B.10. Colors

Here you can alter the font color for the Main text (default: black), for Greyed out notes (default: light grey)for the background color for the Page (default: white) and for Shaded boxes (default: red). The button Reset sets the color back to the default.

Clicking any button showing Default or Change opens a dialog enabling you to choose from a selection of colors or from a color-picker or to specify a color using HSL or RGB values. In the dialog you can add any color to the custom colors to select them later more quickly.

Note, if you change the Main text font color and use the option Color links in the document settings under PDF properties, you probably also need to change the link font color as described in section 6.10.

You can adapt the Main text font color and the Page background for every page in your document if you use these commands as TEX Code after a forced page break:

- For the page color:
  \pagecolor{color name}

- For the text color:
  \color{color name}

You are restricted to one of **black**, **blue**, **cyan**, **green**, **magenta**, **red**, **white** or **yellow** for the **color name** unless you have defined your own color (see the section *Colored Tables* of the *Embedded Objects* Manual).

If you have changed a text or background color, you can use the following names to refer to them:

- For the Page background color:
  page_backgroundcolor

- For the Main text color:
  document_fontcolor

- For the Shaded boxes background color:
  shadecolor

- For the Greyed out notes text color:
  note_fontcolor

To see how to define and use custom colors, see section *Colored Cells* of the *Embedded Objects* manual.

B.11. Change Tracking

Here you can do some settings related to change tracking (see sec. 6.17). Alternatively to the menu or toolbar, you can set here whether changes are being tracked and whether they are shown in the output.

Additionally, you can advise LyX to place a change bar in the margin of the output. This might be useful to make changed passages more salient.

B.12. Numbering & TOC

Here you can adjust the Numbering depth of section headings and the section depth in the Table of Contents as described in section 3.3.4.3.

You can typeset lines numbering in the output file by enabling the checkbox at the bottom. The functionality is handled by package lineno and additional options of

this package can be used as well. The most common one are:

right Line numbers to the right margin

switch Line number to the outer margin (left – even pages, right – odd pages)

switch* Line numbers to the inner margin

modulo Print numbers only on multiples of five lines

pagewise Restart numbering for each page

displaymath, mathlines Line numbers for math environments (both options needed).

B.13. Bibliography

Here you can specify if a specific citation style using the LaTeX packages **biblatex**, **natbib** or **jurabib** should be used. If you use BibTeX, you can enable a Sectioned bibliography using the LaTeX package **bibtopic**. If you use BIBLATEX, you can select the style files and specify further options. Finally, you can select a document-specific Processor for the generation of the bibliography. For a further description of these possibilities see section 6.6.

B.14. Indexes

Here you can define the Processor that will generate your index and you can define additional indexes (see section 6.7 for details).

B.15. PDF Properties

The PDF properties are explained in section 6.10.

B.16. Math Options

These options will force LyX to use the LaTeX packages **amsmath**, **amssymb**, **cancel**, **esint**, **mathdots**, **mathtools**, **mhchem**, **stackrel**, **stmaryrd** and **undertilde**, or to use them automatically when they are needed.

amsmath is needed for many constructs, so when you get LaTeX-errors in formulas, ensure that you have this enabled.

amssymb is needed for some special math symbols like bold or upright Greek letters, so when you get LaTeX-errors in formulas, ensure that you have this enabled.

cancel is used for canceled formulas, see section *Canceled Formulas* of the *Math* manual.

esint is used for special integral characters, see section *Big Operators* of the *Math* manual.

mathdots is used for special ellipses, see section *Ellipses* of the *Math* manual.

mathtools is used for the math commands **\overbracket**, **\underbracket**, **\smashoperator**, **\adjustlimits**, **\splitfrac**, **\shortintertext** and labeled arrows, see the corresponding sections in the *Math* manual.

mhchem is used for chemical equations, see section *Chemical Symbols and Equations* of the *Math* manual.

stackrel is used for the math command **\stackrel**, see section *Relations* of the *Math* manual.

stmaryrd is used for a few special math symbols.

undertilde is used for the math command **\utilde**, see section *Accents for one Character* of the *Math* manual.

B.17. Float Settings

Here you can set global float placement and alignment options.

Details are described in the section *Float Settings* of the *Embedded Objects* manual.

B.18. Listings

The listings settings are explained in the chapter *Program Code Listings* of the *Embedded Objects* manual.

B.19. Bullets

Here you can adjust the characters used for the itemize Levels, specify the Font set to be used and set the Size of the bullets. The itemize environment is described in section 3.3.6.2.

You can furthermore specify a Custom Bullet by inserting in this field the LaTeX command of the desired character. For example to use the € sign, you have to insert the command **\texteuro**. For math symbols you additionally need to enclose the

command with $ signs. To use e. g. the symbol ↻ you need to enter **\$\circlear-rowright\$**. To find the command for a math symbol, create a formula and hover the mouse over the desired symbol in the math toolbar.

Note: Some characters require to load special LATEX-packages in the preamble (menu Document ▷ Settings ▷ LATEX Preamble). For example for the € sign one needs to add the line **\usepackage{textcomp}** to the preamble. For most math symbols it is sufficient to add the line **\usepackage{amssymb}**.

B.20. Branches

Branches are described in section 6.9.

B.21. Output

Here you can define some output specifics for the current document:

LyX Format The option Save transient properties controls whether document settings that are frequently switched or that are specific to the user are saved with the document. The properties that are affected by option are currently:

- the activation of change tracking

- the output of tracked changes

- the recording of the document directory path.

Disabling the option can prevent issues in collaborative work and/or when using a version control system (for instance unnecessary merge conflicts)

Default Output Format: The format that is used when you enter "View", "Update", "View Master Document" and "Update Master Document" in the Document menu or the toolbar. The default is set in Tools ▷ Preferences ▷ File Handling ▷ File Formats, see section C.7.2.

LaTeX Output Options offers settings for the LaTeX export.

- Synchronize with Output enables Forward search and allows to customize the macro used in this process (for a detailed description see section *Reverse DVI/PDF search* of the *Additional Features* manual).

- Put fragile content out of moving arguments determines whether so-called 'fragile' LATEX constructs (such as labels or index entries) are placed outside of so-called 'moving arguments' in LATEX (such as sections or captions), even if the corresponding insets are placed in such context in LyX. This setting is on by default, since it prevents nasty LATEX errors. If you rely on

labels or index entries being kept inside the problematic macros, you can uncheck this. If you don't know what we are talking about here, worry not: just leave it checked.

XHTML Output Options offers settings for the export format LyXHTML. Strict XHTML 1.1 will assure that the output follows exactly version 1.1 of the XHTML standard. The different Math output settings are described in detail in section *Math Output in XHTML* of the *Additional Features* manual. Math image scaling is used for the size of equations in the output.

DocBook Output Options offers settings for the export format DocBook. The details for the options are described in the chapter *DocBook Output* in the *Additional Features* Manual.

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Allow running external programs If this is switched on, LATEX is run with the `-shell-escape` option which is needed with some packages. Note that this comes with security risks, so please use this only when really necessary and if you know what you are doing.

B.22. LaTeX Preamble

In this text field you can enter commands to load special LATEX-packages or to define LATEX-commands. The preamble is a thing for LATEX-experts. You should not enter commands here until you know exactly what you are doing.

An introduction to the LATEX-syntax is given in section 6.11.2.

C. The Preferences Dialog

The preferences dialog is called with the menu Tools ▷ Preferences. It has the following submenus.

C.1. Look and Feel

C.1.1. User Interface

C.1.1.1. User Interface File

The appearance of the menus and toolbars can be changed by choosing a user interface (ui) file. A ui-file is a text file where the toolbars and menus are listed. The file *default.ui* loads three files:

stdmenus.inc specifies the menu entries for the standard menus

stdcontext.inc specifies the menu entries in popup context menus

stdtoolbars.inc specifies the toolbar buttons

To create your own menu and toolbar layout, start with a copy of these files and edit the entries.

The syntax of the .inc-files is straightforward: the Menubar, Menu and Toolbar entries must be finished with an explicit End. They may contain Submenu, Item, OptItem, Separator, Icon, and in the case of the "file_lastfiles" menu a Lastfiles entry. The syntax for the entries is:

Item "menu or **button name" "LYX function"**

All the LYX-functions are listed in the menu Help ▷ LyX Functions.

For example, assuming you use the menu Navigate ▷ Bookmarks quite often and therefore want six available bookmarks, you can add the line

Item "Save Bookmark 6" "bookmark-save 6"

to the "navigate_bookmarks" menu in *stdmenus.inc* to have the sixth bookmark.

Icon Set allows you to change the appearance of LYX's toolbar buttons. The currently available icon sets are compared in this image.

User interface style allows you to change the look and feel of LyX's user interface control elements. There may be different choices available on different operating systems. On certain operating systems some styles may support dark mode while others don't. In order to use dark mode in LyX you may first need to enable it in your system's settings.

C.1.1.2. Context help

The option **Enable tool tips in main work area** enables tool tips showing the content of closed insets like index entries or footnotes.

C.1.1.3. Menus

Maximum last files is the number of last opened files that LyX should display in the menu File ▷ Open Recent.

C.1.1.4. Fullscreen

Here you can specify what is hidden in the fullscreen mode. With the option **Limit text width** you can specify the width of the text in fullscreen mode. This way you can display the text smaller than the screen; the text then appears centered.

C.1.2. Document Handling

C.1.2.1. Session handling

With the option **Restore window layouts and geometries** LyX's main window will be opened with the size and layout that was used in the last LyX session.

The option **Restore cursor positions** sets the cursor to the position in the file where it was at the end of the last session.

The option **Load opened files from last session** opens all files that were opened in the last LyX session.

The button **Clear all session information** deletes all information from previous LyX sessions (cursor positions, names of last opened documents, etc.).

C.1.2.2. Backup & saving

Backup original documents when saving creates a backup copy of the file in the state when it was saved the last time. It is stored in the **Backup directory** (see section C.3) or in the same folder as your document if no **Backup directory** is specified. The backup file has the file extension `.lyx~` and the same name than the original file. If

a Backup directory is specified, the file has the full path in its file name, separated by "!", e. g. `!MyDir!MySubDir!Filename.lyx~`.

If the option Make auto-save snapshots every X minutes is checked, LyX furthermore automatically saves snapshots of the current document (including unsaved changes) in the specified interval if there are unsaved changes. These files which are stored as `#<filename>.lyx#` in the document's directory are overwritten on each auto-save cycle and deleted when the document is closed normally. Should LyX crash with unsaved changes and the restoration from the emergency file fail, this file can be used as a resort.

Please read section 2.2 for more details on LyX's diverse backup and safety mechanisms.

Save documents compressed by default always saves files in a compressed format (see also section A.6.10). This applies to newly created documents only. The compression status of existing documents is not changed when saving.

Save the document directory path stores the path of the document in the LyX file. This is particularly handy if you have included files (such as graphics or child documents) which are referred to with relative paths. The option then allows moving the document elsewhere and still finding these included files if they are still in their original directories.

C.1.2.3. Windows & work area

If the option Open documents in tabs is not checked, every file will be opened in its own new instance of LyX.

The option Single instance is only active if a LyXServer pipe[1] is specified. If it is checked, LyX documents will be opened in the same running instance of LyX. Otherwise a new LyX instance is created for each file.

If the option Single close-tab button is checked, there will only be one close button () at the right side of the tab bar to close tabs. Otherwise every document tab has its own close button. Regardless of this option, one can always close a tab by middle-clicking it in the tab bar.

Note: For this option you have to restart LyX before the change takes effect.

With the setting Closing last view you one can decide if a document is closed or hidden when its tab or view is closed. Hidden documents are accessible via the menu View ▷ Hidden. Not to close documents can be useful if you open files parallel in several instances of LyX and only want to close the view in once instance.

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[1]See section C.3 for information about LyXServer pipes.

C.1.3. Screen Fonts

These fonts are used to display your documents within LyX.

Note: This section only deals with the fonts *inside* the LyX window. The fonts that appear in the output are independent of these fonts, and set in the menu Document ▷ Settings ▷ Fonts.

By default, LyX uses `Times` as its Roman (serif) font, `Arial` or `Helvetica` (depends on the system) as its Sans Serif font and `Courier` as its Typewriter font.

You can change the font size with the Zoom setting.

The Font Sizes are calculated as letter height in units of points. 72.27 points have the size of 1 inch, see Appendix D. The default font sizes are the same as if a document font size of 10 pt were used. The sizes are explained in detail in section 3.7.3.

C.1.4. Colors

Here you can change the screen colors used by LyX by choosing an item in the list and selecting the Alter button.

By checking the option Use system colors the color scheme of your OS or window manager is used. The colors cursor, selection, table line, text, URL label and URL text are then not customizable and thus not listed.

C.1.5. Display

Here you can specify if graphics are displayed inside LyX.

Instant Preview enables previewing snippets of your document. This feature is described in section 6.13.

Checking the option Mark end of paragraphs displays a pilcrow (¶) at the end of every paragraph.

C.2. Editing

C.2.1. Control

C.2.1.1. Editing

The option Cursor follows scrollbar sets the cursor to the top of the currently displayed document part when scrolling.

You can adjust the width of the cursor. If you set the value to zero, the thickness of the cursor scales relative to the zoom value you choose for the screen fonts.

Scroll below end of document is self-explanatory.

In L$_Y$X one can jump from word to word by pressing Ctrl+arrow key. With the option Use Mac-style for cursor moving between words the cursor jumps from the end of a word to the end of the next word. Normally it jumps from the beginning to the beginning.

The option Keep change tracking markup on copy and paste is only relevant in documents that *do not* track changes. In such documents, change-tracked text will be copied and pasted as is (keeping *addition* and *deletion* markup) with this option selected. It the option is not selected, pasted text will be inserted without any markup (i. e., as 'unchanged' text). This also applies to wrapping to/dissolving from insets. In documents that *do* track changes, pasted text is *always* marked as 'new' notwithstanding the state of this option.

The option Sort environments alphabetically sorts the entries in the pull-down box for the paragraph environments.

The option Group environments by their category groups the entries in the pull-down box for the paragraph environments.

The Edit math macros options determine the editing style for math macros, see the section *Math Macros* of the *Math* manual.

The option Search drive for cited files allows L$_Y$X to query your disk for cited documents when using the Try to Open Citation Content... context menu on a citation. The Pattern field determines the search pattern. See sec. 6.6.3 for details.

C.2.2. Shortcuts

Bind File specifies the file to be used to bind a L$_Y$X function to a key. Several binding files are available, among them:

cua.bind a typical set of PC keyboard shortcuts

(x)emacs.bind a set of bindings similar to those used in the editor programs Emacs (XEmacs)

mac.bind a set of bindings for Mac OS systems.

There are also binding files designed for special document classes, like *broadway.bind*, and binding files for special languages. The names of language binding files begin with a language code, e. g. "pt" for Portuguese. If you use L$_Y$X in a certain language, L$_Y$X will try to use the appropriate binding file.

Some binding files, like *math.bind*, only have a limited scope. When looking at the end of the file *cua.bind*, you can see that they are included to keep the overview in the bind-file.

The field Show key-bindings containing allows you to search for the shortcut provided for a particular function in the selected key binding file.

C.2.2.1. Editing Shortcuts

To add new or modify existing key bindings to your own taste you can use the table in the dialog that lists all LyX functions and the bound shortcuts. To find functions easily, they are grouped by categories and the dialog provides the field Show key-bindings containing. In this field you can insert a keyword for a function you want to edit. Insert there for example as keyword "paste" and you get the four different existing shortcuts for the three different functions that contain "paste" in their name. As you can see, one function can have more than one shortcut. All LyX functions are also listed in the file LyX Functions that you will find in the Help menu.

For example, to add the shortcut Alt+Q for the function textstyle-apply, select the function and press the Modify button. A dialog pops up where you can add the shortcut by using it. So press Alt+Q to define the shortcut.

Modifying an existing shortcut is done the same way. You can also bind multiple functions to one shortcut by starting the LyX Function definition with "`command-alternatives`" and following it with the different function names as a semicolon separated list. LyX will then use the first function that is enabled in the current document part.

If you don't like a particular shortcut, you can remove it.

Alternatively you can also edit shortcuts by modifying binding files with a text editor. The syntax of the entries is:

\bind "key combination" "LyX function"

Note, though, that the key combination definition uses a specific syntax. This applies to the designators of specific modifier keys (e. g., M, S, C for Meta/Alt, Shift, Ctrl, respectively) as well as to the other keys. Note particularly that you cannot use non-alphanumeric characters directly in the definition of the key combination, but must use commands following the Xlib standard instead (please refer to the existing bind files for a model). So if you wanted to bind a command to the key combination Alt+Shift+:, you needed to specify it as `M-S-colon`. If you use the dialog to edit key bindings, you don't have to care for these specifics. LyX transforms your input to the correct syntax.

C.2.3. Keyboard/Mouse

Normally keyboard settings are made in a menu of your operating system. For the case where this is not possible, LyX provides keyboard maps. If, for example, you have a Czech keyboard but want to use it as if it is a Romanian one, you can enable Use keyboard map and select the keyboard map file named *romanian.kmap*.

You can specify a First and a Second keyboard map and, if you use the *cua* bindings, you can select the first and second with Alt+K 1 and Alt+K 2 respectively or toggle between them with Alt+K T.

Note: Keyboard maps can only provide a makeshift solution and don't work on all systems.

You can also specify the mouse Wheel scrolling speed. The standard value is 1.0; higher values speed up the scrolling, lower ones slow it down. With the option Middle mouse button pasting you can determine if pressing the middle mouse button (or the mouse wheel) inserts the content of the clipboard.

If you Enable Scroll wheel zoom, you can select a key for zooming. When this key is pressed and the mouse wheel is rotated, the text is zoomed.

C.2.4. Input Completion

Input completion is described in section 2.7.

C.3. Paths

The paths to the various resources used by LyX are normally determined during the installation. But there may be reasons why you might want to modify them.

Working directory This is LyX's working directory. It is the default when you Open, Save or Save As files.

Document templates This directory contains the templates that are shown in File ▷ New from Template.

Example files This directory contains the example files that are listed in File ▷ Open Example.

Backup directory Backup copies will be saved to this directory. If no directory is given but backups are enabled as described in section C.1.2.2, the Working directory will be used to save the backups.
Backup files have the ending ".lyx~".

LyXServer pipe Here you can enter the name of a so-called UNIX-pipe. This pipe is used to send data from external programs to LyX.
Example: You add a BibTeX database *test.bib* to your document. You can edit this file with the program JabRef. In JabRef you have to use the same Unix-Pipe for LyX in its preferences under External programs. If you want to get one entry of the database as citation, select it in JabRef and click on the LyX symbol. The entry will now be inserted as a citation at the current cursor position in your LyX file. Of course, JabRef and LyX need to be running the

same time.

The pipe is also used for the Single instance feature, see section C.1.2.2.

To use the LyXServer-Pipe on Windows, you must use this pipe name:

\\.\pipe\lyxpipe

Temporary directory Temporary files will be saved in this directory.

Thesaurus dictionary Directory where the thesaurus dictionaries are located. You only need to specify it if the thesaurus does not work or if you want to use custom/alternative dictionaries.

Hunspell dictionary Directory where the dictionaries of the spell checker program `Hunspell` are located. You only need to specify it if you are using `Hunspell` and spell checking does not work or if you want to use custom/alternative dictionaries. For LyX on Windows `Hunspell` is the only available spell checker and should work without specifying a directory.

PATH prefix This field contains a list of paths to external programs. When LyX needs to use an external program, it looks in this list to see where to find it on the system. The path list is automatically set up on Windows and Mac systems when LyX is configured; so you normally don't have to modify it. On Unix / Linux systems, the path list will need to be set only if there are external programs you wish to use that are not in your normal system path ($PATH).

TEXINPUTS prefix The TEXINPUTS environment variable allows you to use external files which are included in a LyX document via commands in TeX code or in the document preamble. This prefix includes by default the document directory (represented by a single dot ''). The prefix can contain any list of paths separated by the default separator of the OS (':' on UNIX like systems and ';' on Windows). If files are included, the paths listed in the TEXINPUTS prefix will be scanned for the input files. Note that any non-absolute path listed in the TEXINPUTS prefix is considered to be relative to the directory of your LyX file. It is recommended that you always include '.' as one of the paths; otherwise compilation may fail for some documents.

C.4. Identity

Here you can insert your Name and E-mail address. These will be used when you have enabled change tracking, as described in section 6.17, to mark changes you make as yours.

C.5. Language Settings

C.5.1. Language

User interface language Here you can select the language for L_YX's menus. You can find its actual translation status here: https://www.lyx.org/I18n

C.5.1.1. LaTeX Language Support

Language package determines which LaTeX package should be loaded to handle language issues. Language issues that are handled by this package include proper hyphenation as well as localization of dates and text strings such as "Chapter" and "Table". The most widespread language package is **babel**; it is the default language package in classic LaTeX. More recent typesetting engines such as XeTeX and LuaTeX come with the alternative language package **polyglossia** that is more suited to the multi-script support of these engines. Furthermore, there are also specific language packages for languages not covered by **babel**. The available selections are described in section B.9.

Command start Here you customize the command that is used to switch to a different language. This might be useful if you want to use a different command with **babel** (which provides several alternative commands with different behavior), or if you use a custom language package with specific commands, such as **ArabTeX** [24], which needs the start command `\begin{arabtext}`. The default is the **babel** command `\selectlanguage{$$lang}`, whereby `$$lang` is a placeholder that is substituted with the respective language name in the LaTeX output. Note that with **polyglossia**, this setting is ignored.

Command end Use this if the language switch set in `Command start` needs to be explicitly ended, as in **babel**'s alternative command `\begin{otherlanguage*}`...`\end{otherlanguage*}`. Empty by default, as `\selectlanguage{$$lang}` does not need to be explicitly ended (the switch remains valid until the next `\selectlanguage{$$lang}`). Note that with **polyglossia**, this setting is ignored.

Set languages globally If this option is set, the languages used in the document will be added to the document class options rather than the language package options. Since the document class passes all options in gets to all loaded LaTeX-packages, all language-aware packages will be informed about the used languages this way.

Set document language explicitly If this option is set, the language switch defined in `Command start` is output at the beginning of the document, thereby explicitly switching to the document language. This assures that the correct language is used in any case. This might be needed if you use a non-default `Command start`

or if a package resets the document language. If not set, the language that is active at document start is used (this usually should be the document language).

Unset document language explicitly Counterpart to Set document language explicitly. If set, the Command end is output at the end of the document.

C.5.1.2. Editor Settings

Mark additional languages If set, all text in a language different to the document language will be marked (by default with a blue underline).

Right-to-left cursor movement Here you can define how cursor movement (with the arrow keys) behaves when writing scripts with right-to-left direction (e.g., Arabic, Hebrew or Farsi).

Logical means that the cursor follows the logic of the text direction, and the arrows' direction relates to the directionality of the main paragraph language. E. g., in embedded right-to-left text in a left-to-right paragraph (say, Hebrew embedded in English), the cursor starts at the right (that is, at the *beginning* of the embedded passage in the right-to-left logic) when coming from the left. The meaning of the key is thus swapped for that part; right arrow in this specific case always means: move *forward* in text (even if this means: *move left*). This setting might be useful in texts that mix left-to-right and right-to-left scripts, since the cursor then follows a coherent "text logic".

Visual means: always move to the direction towards which the arrows really point. In this case, in embedded right-to-left text in a left-to-right paragraph, the cursor starts at the left (in the text logic: *from the end*) when coming from the left. The visual meaning of the key is thus maintained in all cases, at the expense of the text logic.

C.5.1.3. Local Preferences

Default decimal separator Defines the default decimal separator for use in tables (decimal separator alignment). By default, the appropriate character for the current language is selected (e. g., dot for English, comma for German), but you can also specify a specific (static) custom character here.

Default length unit Defines the unit that is used as default for lengths in LyX's dialogs.

C.5.2. Spellchecker

The spellchecker settings are explained in section 6.15.

C.6. Outputs

C.6.1. General

Forward search Commands that will be used for the menu Navigate ▷ Forward search. For a detailed description see section *Reverse DVI/PDF search* of the *Additional Features* manual.

Dvips Options Options for the program `dvips` that is used for the export format Postscript, see section A.1.15. Possible options are listed in the `dvips` manual: https://www.tug.org/texinfohtml/dvips.html#Option-details

Output line length sets the maximum number of characters printed in one line when using the menu File ▷ Export ▷ Plain text. Setting the line length to 0 means all text is printed in one endless line.

Overwrite on export Setting what LyX is allowed to overwrite on export.

C.6.2. LaTeX

DVI viewer paper size options They only have an effect when the program xdvi is used as DVI-viewer, read its manual to find out more.

Here you can also specify options and commands with parameters for processors. But before you change something, it is strongly recommended to read the manuals of the applications.

Bibliography generation Settings for the generation of the bibliography, see section 6.6.2.

Index generation Settings for the generation of the index, see section 6.7.8.

Nomenclature command Command for the program that generates the nomenclature, see section 6.8.5.

CheckTeX command Command for the program CheckTEX that is described in the section *Checking TEX* of the *Additional Features* manual.

There are additionally the following options:

Use Windows-style paths in LATEX files Uses paths in the notation of Windows, that means that "\" is used instead of "/" to separate folders. This option is enabled by default when you use LyX on Windows.

Reset class options when document class changes Removes all manually set Class options in the Document ▷ Settings ▷ Document Class dialog when changing the document class.

C.7. File Handling

C.7.1. Converters

Here you find the list of defined converter commands to convert material from one format to another. You can modify converters or create new ones. To modify a converter, select it, change the entry of the Converter and/or Extra flag field and press the Modify button. To create a new converter, select an existing one, select a different format in the To format drop-down list, modify the Converter field and press the Add button.

If the Converter File Cache is Enabled, conversions will be cached as long as specified in the field Maximum Age (in days). This means that images don't need to be converted again when you reopen a document; the converted images from the cache will be used instead.

More about converters, like the flags that can be used in the converter definition, is described in the section *Converters* of the *Customization* manual.

C.7.2. File Formats

Here you find the list of defined file formats that L_YX can handle. You can modify the Editor and Viewer programs that should be used for certain formats.

You can also define the Default output format that is used when you use View, Update, View Master Document or Update Master Document in the Document menu or the toolbar.

More about formats and their options is described in the section *Formats* of the *Customization* manual.

Since all conversions from one format to another take place in L_YX's temporary directory, it is sometimes necessary to modify a file before copying it to the temporary directory so that the conversion may be performed. This is done by specifying a Copier. More about this is described in the section *Copiers* of the *Customization* manual.

D. Units available in LyX

Table D.1 explains all the units available in LyX and used in this documentation.

Table D.1.: Units

unit	name/description	LaTeX command
bp	big point ($72\,\mathrm{bp} = 1\,\mathrm{in}$)	-
cc	cicero ($1\,\mathrm{cc} = 12\,\mathrm{dd}$)	-
cm	centimeter	-
dd	didot ($1\,\mathrm{dd} \approx 0.376\,\mathrm{mm}$)	-
em	width of letter M in current font	-
ex	height of letter x in current font	-
in	inch	-
mm	millimeter	-
mu	math unit ($1\,\mathrm{mu} = 1/18\,\mathrm{em}$)	-
pt	point ($72.27\,\mathrm{pt} = 1\,\mathrm{in}$)	-
pc	pica ($1\,\mathrm{pc} = 12\,\mathrm{pt}$)	-
sp	scaled point ($65536\,\mathrm{sp} = 1\,\mathrm{pt}$)	-
Column Width %	% of column width	\columnwidth
Line Distance %	% of height between baselines of two subsequent text lines	\baselineskip
Line Width %	% of line width	\linewidth
Page Height %	% of paper height	\paperheight
Page Width %	% of paper width	\paperwidth
Scale Graphics %	% of original image width	
Text Height %	% of text height	\textheight
Text Width %	% of text width	\textwidth

D. Units available in L_YX

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Nomenclature

@, |, !, " The quote sign in TeX code is output by writing ' "" '.

a dummy entry for the character ""a""

Alt Alt or Meta key

Ctrl Control key

Esc Escape key

Shift Shift key

Tab Tabulator key

σ dummy entry for the character **sigma**

Index

Word completion, *see* Input completion
Word count, 154