LyX: advanced features

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What's this talk about

Shortcuts

Charts and graphs

Instant preview
Xy-pic
TikZ

Presentations
Indice

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Presentations
The problem

- Using the mouse lowers the productivity
  - Insert parentheses
  - Choose paragraph type
  - ...

LyX user commands

- User commands allow to use any LyX feature\(^1\)
- You can issue them on a command line
- You can associate them with a shortcut
- They work in math-mode too

\(^1\)For a complete list of user functions refer to the wiki page: LyxFunctions
An example

• Let’s add some text in math-mode
• To show the command line
  • Alt + X
  • View ▸ Toolbars ▸ Command buffer
• math-insert supercalifragilisticaespiralitoso
Layout

- layout Itemize
- layout Enumerate
- layout Part
- layout Section
- layout Subsection
- layout Subsubsection
- layout Paragraph
- layout Subparagraph
• Insert parentheses: \texttt{math-delim ( )}
• Insert square brackets: \texttt{math-delim [ ]}
• Insert multiplication symbol: \texttt{math-insert \cdot}
Matrices

- Insert a matrix: \texttt{math-matrix}
- Add a column: \texttt{inset-modify tabular append-column}
- Remove a column: \texttt{inset-modify tabular delete-column}
Shortcuts

• You can associate a user command to a shortcut
  • Tools ➤ Preferences ➤ Editing ➤ Shortcuts
Shortcuts VS math macros

**Shortcuts**

- Work in the whole LyX environment
- Useful for most frequent and general keystrokes

**Macros**

- They are tied to a single document
- They work just in math-mode
- Useful for recurring math expressions
- They allow the use of parameters
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Chart and graphs in LyX

- LyX doesn’t offer any specific feature for them
- We can use $\LaTeX$ packages inside
- We can have an instant preview of the output in LyX
The instant preview in LyX

• Enable the instant preview?²
  • Tools ▶ Preferences ▶ Look & Feel ▶ Display ▶ Instant Preview ▶ On

• You can use it on any part of the document
  • Select some portion of the document ▶ Insert ▶ Preview

• It’s enabled for math formulas too

²To activate instant preview you need to install the preview-latex package from the package manager of your \LaTeX{} distribution
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Why $\text{XY-pic}^3$?

- $\LaTeX$ package for simple graphs made of nodes and arcs
- Not the most powerful but we can use it in a matrix
- So we can use it in the LyX’s math editor

$^3$Official web site and user guide, see also Help ▶ Specific manuals ▶ XY-pic manual
Example

- Left rotation of a red-black tree
How does it work?

1. Create a math formula (centered or inline)
2. \xymatrix
3. Add lines (Ctrl + Enter) and columns (Ctrl + Shift + C)
4. Put letters, symbols or text in the cells
The arrows

• To create an arrow from a cell to the lower right one: \texttt{\textbackslash ar[dr]}

\[ A \rightarrow B \]

• Four cells left: \texttt{\textbackslash ar[llll]}

\[ B \leftarrow A \]

• Put text over and under the arrow: \texttt{\textbackslash ar[rr] ^ Over _ Under}

\[ A \underbrace{\text{Over} \atop \text{Under}} \rightarrow B \]
Arrow types

• No tips: \(\text{\textbackslash ar@\{\text{-}\}[r]\text{\textasciitilde}}\)

\[A \quad \rightarrow \quad B\]

• Double arrow and tips in both directions: \(\text{\textbackslash ar@\{<\text{\textasciitilde}\text{\textasciitilde}\}}[r]\)

\[A \leftrightarrow \leftrightarrow B\]

• Double tip and dashed: \(\text{\textbackslash ar@\{\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\}}[r]\)

\[A \quad \rightarrow \quad \rightarrow \quad \rightarrow \quad \rightarrow \quad B\]

• “Notch” effect: \(\text{\textbackslash ar@\{\text{|-|}\}}[r]\)

\[A \quad \rightarrow \quad B\]

• Tip at the start and dotted line: \(\text{\textbackslash ar@\{\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\text{\textasciitilde}\}}[r]\)

\[A \quad \rightarrow \quad B\]

\(^4\text{To add curly brackets: \textbackslash and then \{}\)
• You can choose start and end points like @ (start, end)

Example

• \( \ar @(dr,ul)[r] \):

\[
\begin{array}{c}
A \\
\ar \\
B
\end{array}
\]

• \( \ar @(d,u)[r] \):

\[
\begin{array}{c}
A \\
\ar \\
B
\end{array}
\]

• \( \ar @(d,d)[r] \):

\[
\begin{array}{c}
A \\
\ar \\
B
\end{array}
\]

• \( \ar @(d,u) \):

\[
\begin{array}{c}
A \\
\ar \\
B
\end{array}
\]
Boxes

Example

• *[F]{}: 

• **+[F={A}: 

• **+[o][F={}:

• **+++[o][F={A}: 

• **++++[o][F={}:
Combine everything
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Presentations
Here comes \LaTeX...

- In LyX we can directly insert \LaTeX\ code
  - Ctrl + L
  - Insert $\rightarrow$ \TeX\ Code
- You can even put it in an instant preview inset
  - Right click $\rightarrow$ Warp by Preview
- So we can use any \LaTeX\ package directly from LyX
TikZ

• Also known as pgf
• Powerful package for graphics and charts
• There are also specific packages based on TikZ:
  • pgfplots: function graphs (based on gnuplot)
  • circuitikz: circuits
  • ...

\footnote{Page on CTAN, SourceForge project and user guide}
Example: a rectangle

- Document ➤ Settings ➤ \LaTeX Preamble ➤ Add
  \usepackage{tikz}

\begin{tikzpicture}
  \draw (0,0) to (3,0) to (6,0) to (6,3) to (3,3) to (0,3) to (0,0);
\end{tikzpicture}
The rectangle
From rectangle to circuit

- Document ▶ Settings ▶ \LaTeX\ Preamble ▶ Add
\usepackage[siunitx]{circuitikz}\(^6\)

\begin{tikzpicture}
\draw (0,0) to[R=1\,\text{kilo}\text{\,\,\,ohm}] (3,0) to[I, i=50\,\text{\,\,\,milli}\text{\,\,\,\,ampere}] (6,0) to[R=516\,\text{ohm}] (6,3) to[V, v=50\,V] (3,3) to[diode] (0,3) to[ospst=S] (0,0);
\end{tikzpicture}

\(^6\)CTAN page and manual
The circuit
Function graphs

- Document ➤ Settings ➤ \LaTeX Preamble ➤ Add
  \usepackage{pgfplots}^{7}

\begin{tikzpicture}
  \begin{axis}[
  grid=major, samples=30, mark=none]
    \addplot [blue, very thick, domain=-1:1]
    \{x^3\};
  \end{axis}
\end{tikzpicture}

^{7}CTAN page and manual
Graphs of $x^3$
Graphs with a single line

- **LaTeX** is too long to write it manually each time
- We can create a command in the preamble:

\begin{verbatim}
\newcommand{\plotta}[3][6cm]{
    \begin{tikzpicture}
        \begin{axis}
            [width=#1,grid=major,samples=100,mark=none]
            \addplot[blue,very thick,domain=#3] {#2};
        \end{axis}
    \end{tikzpicture}
}
\end{verbatim}
The cosine

\[ \text{\verb|\plotta{cos(x)}{|-180:180|} } \]
Graphs with gnuplot

- pgfplots supports gnuplot\(^8\)
  - More powerful
  - More popular

- We can create the command `\gnuplotta`:

\begin{verbatim}
\newcommand{\gnuplotta}[3][6cm]{
  \begin{tikzpicture}
    \begin{axis}
      [width=#1,grid=major,samples=100,mark=none]
      \addplot[blue,very thick,domain=#3]
      gnuplot {#2};
    \end{axis}
  \end{tikzpicture}
}
\end{verbatim}

\(^8\)Official website and documentation, to make gnuplot under Windows you have to put gnuplot.exe path in Preferences ▶ Paths ▶ PATH prefix and enable write18, under Debian/Ubuntu you have to add gnuplot to the shell_escape_commands variable in texmf.cnf
Results

• \texttt{\textbackslash gnuplotta[9cm]{rand(0)}{-10:10}}
3D graphs

- We can even plot 3D graphs
- Let's create the command `\plottre`:

```latex
\newcommand{\plottre}[4][6cm] {
    \begin{tikzpicture}
        \begin{axis}[width=#1,view={60}{30}]
            \addplot3
                [mesh,z buffer=sort,scatter,only marks,
                scatter src=z,samples=30,domain=#3,y domain=#4]
                (#2);
        \end{axis}
    \end{tikzpicture}
}
```

\footnote{The `\addplot3` command is available only in recent versions of pgfplots, here we used version 1.4.1}
$\sin x \cdot \cos y$

\begin{itemize}
  \item \texttt{\textbackslash{plottre}[9cm] \{sin(x)*cos(y)\} \{-1:1\} \{0:360\}}
\end{itemize}
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Presentations
Presentations

• LyX allows to create presentation with beamer\textsuperscript{10}
  • Beamer supports themes
  • Heavily customizable
• You won’t use PowerPoint or OpenOffice.org Impress any longer

\textsuperscript{10}User guide and the official website Beamer
First presentation

• File ▸ New
• Document ▸ Settings ▸ Document class ▸ Presentation (beamer)
• Paragraph type ▸ BeginFrame, give a title
• New line, write body frame
  • New line, paragraph type ▸ EndFrame
Titling

• In the first slide you can put various information
  • Title, Subtitle, Author, Date...
• You can find paragraph types under “Titling”
• You can divide the same slide in more blocks
• You can divide the same slide in more blocks
• This way
• You can divide the same slide in more blocks
• This way
• You can do this with a Pause paragraph
Display order

- You can set the display order
- At the beginning you insert \LaTeX\ code (Ctrl + L)
- for the first item, `<2->` for the second item and so on
Indexes

- You can add sections and subsections in presentations too
- So you can create indexes
  - Insert ▸ List /TOC ▸ Table of Contents
- Here’s a snippet to have an index at the beginning of each subsection
  - Document ▸ Settings ▸ \texttt{\LaTeX} preamble

\begin{Verbatim}
\AtBeginSubsection[]{
  \frame<beamer>{
    \frametitle{Indice}
    \tableofcontents[currentsection, currentsubsection]
  }
}
\end{Verbatim}
• Beamer presentations support customizable themes
• Document ▶ Settings ▶ \LaTeX{} preamble
  • \texttt{\usetheme{themenname}}
• Here are the available themes:
  • Default themes: Warsaw, Singapore, Boadilla, Dresden...\textsuperscript{11}
  • More themes: collection at simon04.net and at juluribk.com
  • This theme: lankton-keynote (inspired to Apple keynotes)

\textsuperscript{11} Preview of all beamer default themes
Other features

• Beamer gives a lot of other features
  • Blocks
  • Theorems and corollaries
  • ...

• File ➤ New from Template... ➤ beamer-conference-ornate-20min.lyx
Questions?