

Dictating mathematics into LyX using Mathfly

Mike Roberts

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Contents

1	Introduction	1
2	Basics	3
3	Miscellaneous	4
4	Letters	5
4.1	Greek	5
4.2	Accents	5
5	Symbols	6
5.1	Common symbols	6
5.2	Less common symbols	8
6	Text modes	8
7	Fractions	9
8	Matrices	9
9	Environments	9

1 Introduction

- All of these bindings can be easily changed by modifying `mathfly/config/lyx.toml` in any text editor or saying "configure LyX"

while the module is enabled.

- (option a | option b) means that both commands will do the same thing.
- Square brackets means that the word(s) inside are optional, the command will work with or without them.

2 Basics

new file	Create a new file
open file	Open a file
save as	Save as
math mode	Insert in-line mathematics
display mode	Insert equation
normal mode	Insert regular text
next tab [$\langle n \rangle$]	Navigate to next tab n times
previous tab [$\langle n \rangle$]	Navigate to previous tab n times
close tab [$\langle n \rangle$]	Close the current tab n times
view PDF	View current document as a PDF
update PDF	Refresh changes
move line up [$\langle n \rangle$]	Move the current line up
move line down [$\langle n \rangle$]	Move the current line down
insert [bulleted] list	Insert a list
insert numbered list	Insert a numbered list
insert description	Insert a description
insert part	Create a part label
insert (section heading)	Insert a heading
insert sub (section heading)	Insert a subheading
insert sub sub (section heading)	Insert a sub subheading
insert paragraph	Insert a paragraph
insert sub paragraph	Insert a subparagraph
insert title	Provide a title
insert author	Provide an author
insert date	Provide a date
insert abstract	Insert an abstract
insert address	Insert an address
insert bibliography	Insert a bibliography
insert quotation	Insert a quotation
insert quote	Insert a quote
insert verse	Insert verse
insert delimiters	Insert more complex bracketry
insert matrix	Insert a matrix (see matrix section for more options)
insert macro	Create a new macro

3 Miscellaneous

math mode	Begins a new mathematical dictation environment, necessary for all maths dictation.
new math line	Begins a new mathematical dictation line.
fraction	Creates a fraction. anything highlighted will form the numerator.
over	Creates a fraction with the previous element as the numerator (e.g. "five over three")
(super [script] to the power)	Superscript
sub [script]	Subscript
squared	Superscript 2
cubed	Superscript 3
inverse	Superscript -1
(parens parentheses)	Parentheses
square brackets	Square brackets
curly brackets	Curly brackets
absolute	Create two bars and moves inside them
summation	\sum_a^b
blank summation	\sum
(summation sum) to N	$\sum_?^n$
product	\prod_b^a
blank product	\prod
product to N	$\prod_?^n$
limit	$\lim_?$
blank limit	\lim
prime	' (prime symbol)
degrees	°
exponential	exp()
expectation	E()
variance	Var()
label above	Add a label above the selected text
label below	Add a label below the selected text

4 Letters

4.1 Greek

By default, all of these commands must be prefixed with "greek" for lowercase or "greek big" for uppercase. This behaviour can be changed by modifying `greek_prefix` and `capitals_prefix`. Where relevant I have provided pronunciation tips for best results.

alpha	α		
beta	β		beater
gamma	γ	Γ	
delta	δ	Δ	
epsilon	ε		
zeta	ζ		
eta	η		eater
theta	θ	Θ	they-tah
iota	ι		
kappa	κ		
lambda	λ	Λ	
mu	μ		moo
nu	ν		new
xi	ξ	Ξ	zee
pi	π	Π	
rho	ρ		
sigma	σ	Σ	
tau	τ		
upsilon	υ	Υ	
phi	ϕ	Φ	
chi	χ		kie
psi	ψ	Ψ	sigh
omega	ω	Ω	

4.2 Accents

These commands add accents above the highlighted text, or create an empty accent if nothing is highlighted.

accent hat	\hat{a}
accent tilde	\tilde{a}
accent dot	\dot{a}
accent double dot	\ddot{a}
accent bar	\bar{a}
accent vector	\vec{a}

5 Symbols

In order to avoid clutter and misrecognition, mathematical symbols are split up into two distinct groups: common and uncommon. By default, common symbols (e.g. integral) need no prefix, while uncommon symbols (e.g. up arrow) are prefixed with "symbol". The prefixes are defined by `symbol1_prefix` and `symbol2_prefix`. It is expected that you will want to move symbols which you happen to use frequently or infrequently between the two groups, or change/remove the prefixes to your liking. There is a trade-off to be made between recognition accuracy and speed of dictation.

5.1 Common symbols

[generic] root	$\sqrt[n]{x}$
square root	\sqrt{x}
integral	\int
double integral	\iint
triple integral	\iiint
times	\times
divide	\div
stop	\cdot
plus or minus	\pm
partial	∂
nice fraction	$\frac{a}{b}$
binomial	$\binom{a}{b}$
infinity	∞
dot dot dot	\dots
vector nabla	∇
greater [than] [or] equal [to]	\geq
less [than] [or] equal [to]	\leq
not equal [to]	\neq

approximately [equal] [to]	\approx
proportional [to]	\propto
preference less [than]	\prec
preference less equal	\preceq
preference greater [than]	\succ
preference greater equal	\succeq
sine	\sin
cosine	\cos
tangent	\tan
secant	\sec
cosecant	\csc
cotangent	\cot
arc sine	\arcsin
arc cosine	\arccos
arc tan	\arctan
hyperbolic sine	\sinh
hyperbolic cosine	\cosh
hyperbolic tangent	\tanh
hyperbolic cotangent	\coth
degree	\deg
determinant	\det
dimension	\dim
(natural (log logarithm) log natural)	\ln
logarithm	\log
argument	\arg
maximum	\max
minimum	\min
(modulo modulus)	mod
supremum	\sup
infimum	\inf
probability	Pr
there exists	\exists
member [of]	\in
for all	\forall
empty set	\emptyset
subset	\subset
superset	\supset
strict subset	\subsetneq

strict superset	\supsetneq
intersection	\cap
union	\cup
real numbers	\mathbb{R}
complex numbers	\mathbb{C}
integer numbers	\mathbb{Z}
rational numbers	\mathbb{Q}
natural numbers	\mathbb{N}
logic and	\wedge
logic or	\vee
logic not	\neg
left arrow	\leftarrow
right arrow	\rightarrow
up arrow	\uparrow
down arrow	\downarrow
left right arrow	\leftrightarrow
maps to	\mapsto
oh plus	\oplus
oh times	\otimes
big oh plus	\bigoplus
big oh times	\bigotimes
diagonal dots	\ddots
horizontal dots	\dots
vertical dots	\vdots

5.2 Less common symbols

Prefix with "symbol"

GCD	gcd
cat hom	hom
kernel	ker

6 Text modes

These commands allow you to insert various forms of regular text into a mathematical environment. They should all be prefixed with "text".

(beeb blackboard bold blackboard)	\mathbb{RNZ}
roman	Sampletext
bold	Sampletext
sans serif	Sampletext
italic	<i>Sampletext</i>
typewriter	Sampletext

7 Fractions

There are a few ways of easily inserting fractions:

- Use the "fraction" command, and navigate through it using directions.
- Use the "over" command, which will build a fraction with the previous element as the numerator. e.g. "x-ray squared over five".
- For denominators up to 10, use their natural names, providing a number for the numerator, e.g. "five thirds".

8 Nested commands

There are a few commands within Mathfly which allow for commands to be inserted within them. These are just examples, you can include any commands you want:

- “Integral from minus infinity to infinity” - integral symbol with superscript and subscript.
- “Definite from zero to ten” - definite integral square brackets with subscript and superscript afterwards.
- “Differential x-ray squared by squared yankee” - creates a differential friction.
- “Sum from india equals one to november” - creates a summation.
- “Limit from november to infinity” - create a limit.

9 Matrices

- To insert a matrix of a particular size, use the matrix command, e.g. "matrix three by one".
- To add or remove columns and rows, Use the command "add/remove matrix column/row".
- Matrices can be encased in brackets as expected, E.g. "parens matrix three by three".

10 Environments

These commands provide more detailed control over equation positioning and alignment.

insert (in line formula in line)	In-line formula - same as "math mode"
insert numbered formula	Numbered formula
insert (display formula display)	Same as "display mode"
insert (equation array environment equation array)	Insert equation array - use the "check" (ctrl-enter) command to start a new line
insert (AMS align environment AMS align)	Insert an aligned equation
insert AMS align at [environment]	
insert AMS flalign [environment]	
insert (AMS gathered environment AMS gather)	
insert (AMS multiline [environment] multiline)	
insert array [environment]	
insert (cases [environment] piecewise)	
insert (aligned [environment] align)	
insert aligned at [environment]	
insert gathered [environment]	
insert split [environment]	