Spacing in math mode

In mathematical mode characters are spaced as if they were part of a single word, regardless of the actual space you insert. This article explains how to insert spaces of different lengths in mathematical mode.

Contents

Introduction

Spacing in maths mode is useful in several situations, let's see an example:

```
Assume we have the next sets
\[
S = \{ z \in \mathbb{C}\, |\, |z| < 1 \} \quad \textrm{and} \quad S_2=\partial{S}
\]
```

Assume we have the next sets

$$S = \{z \in \mathbb{C} \,|\, |z| < 1\} \quad \text{and} \quad S_2 = \partial S$$

As you see in this example, a mathematical text can be explicitly spaced by means of some special commands

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Spaces

The spacing depends on the command you insert, the example below contains a complete list of spaces and how they look like.

```
Spaces in mathematical mode.

\begin{align*}
f(x) =& x^2\! +3x\! +2 \\
f(x) =& x^2+3x+2 \\
f(x) =& x^2\, +3x\, +2 \\
f(x) =& x^2\: +3x\: +2 \\
f(x) =& x^2\; +3x\; +2 \\
f(x) =& x^2\ +3x\ +2 \\
f(x) =& x^2\quad +3x\quad +2 \\
f(x) =& x^2\qquad +3x\qquad +2
\end{align*}
```

Spaces in mathematical mode.

$$\begin{aligned}
f(x) =& x^2+3x+2 \\
f(x) =& x^2+3x+2 \\
f(x) =& x^2\,+3x\,+2 \\
f(x) =& x^2\:+3x\:+2 \\
f(x) =& x^2\;+3x\;+2 \\
f(x) =& x^2\ +3x\ +2 \\
f(x) =& x^2\quad +3x\quad +2 \\
f(x) =& x^2\qquad +3x\qquad +2
\end{aligned}$$

Check the reference guide for a description of the commands.

Note: to see a description of the `align*` environment see Aligning equations with amsmath

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Operators spacing

Spacing around operators and relations in math mode are governed by specific skip lengths:

- `\thinmuskip` (by default it is equal to 3 mu)
- `\medmuskip` (by default it is equal to 4 mu)
- `\thickmuskip` (by default it is equal to 5 mu)

```
\begin{align*}
3ax+4by=5cz\\
3ax<4by+5cz
\end{align*}
```

$$\begin{aligned}
3ax + 4by &= 5cz \\
3ax &< 4by + 5cz
\end{aligned}$$

For relationnal operators, such as < , > and =, LaTeX establishes `\thickmuskip` space. But for binary operators such as +, - and x, the `\medmuskip` space is set. The difference is almost unnoticeable.

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User-defined binary and relational operators

You can force the spacing used in binary or relational operators, so you can define your own.

```
\begin{align*}
34x^2a \mathbin{\#} 13bc \\
34x^2a \mathrel{\#} 13bc
\end{align*}
```

$$\begin{aligned}
34x^2a \mathbin{\#} 13bc \\
34x^2a \mathrel{\#} 13bc
\end{aligned}$$

The previous example sets a particular spacing before and after # by using `\mathrel` (relational) and `\mathbin` (binary) commands.

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Reference guide

Description of spacing commands

LaTeX code	Description
\quad	space equal to the current font size (= 18 mu)
\,	3/18 of \quad (= 3 mu)
\:	4/18 of \quad (= 4 mu)
\;	5/18 of \quad (= 5 mu)
\!	-3/18 of \quad (= -3 mu)
\ (space after backslash!)	equivalent of space in normal text
\qquad	twice of \quad (= 36 mu)

Further reading

For more information see

- Mathematical expressions
- Brackets and Parentheses
- Aligning equations with amsmath
- Display style in math mode
- List of Greek letters and math symbols
- Mathematical fonts
- The not so short introduction to LaTeX 2ε