

# Sample document

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## 1 LAlignAnd

$$\begin{array}{lll} \&= & \begin{array}{l} a = b \\ c = d \end{array} \quad \text{ok} \\ =\& & \begin{array}{l} a = b \\ c = d \end{array} \quad \text{ng} \\ =\{\}\& & \begin{array}{l} a = b \\ c = d \end{array} \quad \text{ok} \end{array}$$

$$\begin{array}{llll} x = y & x \leq y & x \leq y & x < y \\ x \neq y & x \geq y & x \geq y & x > y \end{array}$$

## 2 LAlignEnd

The following ends with a line break.

$$\begin{array}{l} f(x) = ax^2 + bx + c \\ g(x) = dx^2 + ex + f \end{array}$$

The following does not end with a line break.

$$\begin{array}{l} f(x) = ax^2 + bx + c \\ g(x) = dx^2 + ex + f \end{array}$$

Here is the next line after the align environment.

### 3 LAlignSingleLine

Long line before display (same result)	
<p>Lorem ipsum.</p> $f(x) = ax^2 + bx + c$ <p>This is an <code>equation</code> environment.</p>	<p>Lorem ipsum.</p> $f(x) = ax^2 + bx + c$ <p>This is an <code>align</code> environment.</p>

Short line before display (different result)	
<p>Lrm:</p> $f(x) = ax^2 + bx + c$ <p>This is an <code>equation</code> environment.</p>	<p>Lrm:</p> $f(x) = ax^2 + bx + c$ <p>This is an <code>align</code> environment.</p>

Single-line alignat environment is also detected.

$$f(x) = ax^2 + bx + c$$

Multi-line alignat environment is not detected.

$$f(x) = ax^2 + bx + c$$

$$g(x) = dx^2 + ex + f$$

### 4 LLBig

This is a sample text. This is a sample text. This is a sample text.  
 Both bigcup  $\bigcup_{x \in B} O_x$  and cup  $\bigcup_{x \in B} O_x$  do not spoil the line spacing.  
 This is a sample text. This is a sample text. This is a sample text.

$$\begin{array}{ccccccccc}
 X_1 \cap X_2 & X_1 \cup X_2 & X_1 \odot X_2 & X_1 \oplus X_2 & X_1 \otimes X_2 & & & & \\
 X_1 \sqcup X_2 & X_1 \uplus X_2 & X_1 \vee X_2 & X_1 \wedge X_2 & \text{ok} & & & & \\
 \bigcap_{i=1}^{\infty} X_i & \bigcup_{i=1}^{\infty} X_i & \bigodot_{i=1}^{\infty} X_i & \bigoplus_{i=1}^{\infty} X_i & \bigotimes_{i=1}^{\infty} X_i & \bigsqcup_{i=1}^{\infty} X_i & \biguplus_{i=1}^{\infty} X_i & \bigvee_{i=1}^{\infty} X_i & \bigwedge_{i=1}^{\infty} X_i \quad \text{ok} \\
 \cap_{i=1}^{\infty} X_i & \cup_{i=1}^{\infty} X_i & \odot_{i=1}^{\infty} X_i & \oplus_{i=1}^{\infty} X_i & \otimes_{i=1}^{\infty} X_i & & & & \\
 \sqcup_{i=1}^{\infty} X_i & \uplus_{i=1}^{\infty} X_i & \vee_{i=1}^{\infty} X_i & \wedge_{i=1}^{\infty} X_i & \text{ng} & & & & 
 \end{array}$$

### 5 LLBracketCurly

$$\begin{array}{ccc}
 \backslash \max(a,b) & \max(a,b) & \text{ok} \\
 \backslash \max\{a,b\} & \max a,b & \text{ng} \\
 \backslash \max \{a,b\} & \max a,b & \text{ok?}
 \end{array}$$

We cannot fully determine whether the use of curly brackets is wrong or not. It is not detected if some spaces are inserted between the command name and the curly brackets.  $\min(a, b)$  and  $\min a, b$  are also checked.

## 6 LLBracketMissing

$x^{\{23\}}$	$x^{23}$	ok
$x^2\ 3$	$x^2 3$	ok
$x^{23}$	$x^2 3$	ng

$x_2 3$ ,  $x^a b$  and  $x_a b$  are also checked. Cases like  $x^a b$ ,  $x^2$  and  $e^i \pi$  are not detected.

## 7 LLBracketRound

$\sqrt{a}$	$\sqrt{a}$	ok
$\sqrt{a}$	$\sqrt{(a)}$	ng

$a^{(1)}$  and  $a_{(1)}$  are also checked.

## 8 LLColonEqq

$\coloneqq$	$x := y$	ok
$\Coloneqq$	$x ::= y$	ok
$:=$	$x := y$	ng
$::=$	$x ::= y$	ng

The difference is quite subtle, but the vertical position of the colon is different.

## 9 LLColonForMapping

$A:B$	$A:B$	ok
$A\colon B$	$A:B$	ng
$f:$	$f:\mathbb{R} \rightarrow \mathbb{R}$	ng
$f\colon$	$f:\mathbb{R} \rightarrow \mathbb{R}$	ok

— We detect all of : in the following —

Here are examples of colons we detect.

- $f : X \rightarrow Y$
- $g : X \mapsto Y$
- $h : \mathbb{R}^{n^2+2n+1} \rightarrow \mathbb{R}$

and

$$f : (X \text{ at new line in tex file}) \rightarrow (Y \text{ at new line in tex file}). \quad (1)$$

— We do NOT detect any of : in the following —

Here are examples of ‘:’ we do not detect.

- $f:X \rightarrow Y$ , the correct use of `\colon`.
- $A : B : C = 1 : 2 : 3$ , the colon for ratio.
- $A : B = 1 : 2$  and  $X \rightarrow Y$ , separated by dollar sign.
- $g : (\text{some very very very very very long long long long words}) \rightarrow \mathbb{R}$ , the false negative.

## 10 LLCref

**Theorem 1.** *This is a sample theorem.*

Use `Thm. 1` with `cref` instead of `Thm. 1` with `ref` to avoid mistakes.

## 11 LLDoubleQuotes

Use “XXX” instead of “XXX” or ”XXX”. You can use them for `H\“older` and `\verb.`

## 12 LLENDash

<code>hyphen</code>	<code>(-)</code>	A–B
<code>en-dash</code>	<code>(--)</code>	A–B
<code>em-dash</code>	<code>(---)</code>	A—B

- Erdos-Renyi (random graph, Erdős–Rényi)
- Einstein-Podolsky-Rosen (quantum physics, Einstein–Podolsky–Rosen)
- Fruchterman-Reingold (graph drawing, Fruchterman–Reingold)
- Gauss-Legendre (numerical integration, Gauss–Legendre)
- Gibbs-Helmholtz (thermodynamics, Gibbs–Helmholtz)

- Karush-Kuhn-Tucker (optimization, Karush–Kuhn–Tucker)

Exceptions: Award-Winning, Best-In-Class, Bottom-Up, Cutting-Edge, Data-Driven, Deep-Learning, Feature-Based, Feature-Selection, First-Order, Fritz-John, Full-Time, High-Class, High-Dimensional, High-End, High-Quality, Higher-Order, Ill-Defined, Ill-Posed, Long-Term, Low-Dimensional, Machine-Learning, Non-Convex, Non-Empty, Non-Linear, Non-Negative, Non-Positive, Non-Zero, Open-Source, Part-Time, Pre-Processing, Pop-Culture, Real-Time, Reinforcement-Learning, Second-Order, Short-Term, State-Of-The-Art, Third-Order, Top-Down, Top-Rated, User-Friendly, Well-Being, Well-Defined, Well-Documented, Well-Known, Well-Posed, Zero-Sum

False Positive: Wrong-Example

## 13 LLEqnarray

We should not use eqnarray. It has some spacing issues.

$$\begin{array}{rcl} x & = & y \\ a & = & b \end{array}$$

## 14 LLJapanese

日本語の文章で  $x = 1$  と数式を書くと、スペースが欠如します。  
日本語の文章で  $x = 1$  と数式を書くと、スペースが生まれます。  
尤も、フォーマルな文章では非推奨な場合も多く、その為デフォルトでは非検出です。

## 15 LLLlGg

$$\begin{array}{lll} \backslash 11 & n << m & \text{ok} \\ << & n << m & \text{ng} \end{array}$$

I like human <<< cat <<<<<<< dog.

## 16 LLNonASCII

The following line contains non-ASCII characters.

! " # \$ % & ' ( ) \* + , - . /

日本語の文章は、upLaTeXでフツウに書けます。  
(You can write Japanese sentences as usual with upLaTeX.)

## 17 LLPeriod

e.g., test.	e.g., test.	ok
e.g.\ test.	e.g. test.	ok
e.g. test.	e.g. test.	ng

## 18 LLRefEq

To refer to the equation, use (1) with eqref instead of (1) with ref.  
You can avoid the mistake of forgetting to add parentheses.

## 19 LLSharp

\#	#A	ok
\sharp	‡A	ng

If you really want to use ‡, you can disable this rule.

## 20 LLSI

\SI{1}{\kilo\byte}	1 kB	ok
1 kB	1 kB	ng
1kB	1kB	ng

10KB, 3.5 MiB, 500GB are detected. 123 noNumWord GB will not be detected.  
Some command named as EB. This is not ExaByte. This 1EB is one ExaByte.

## 21 LLT

$\top$	$X^\top$	ok
$\mathsf{T}$	$X^\top$	ok
T	$X^T$	ng
{T}	$X^T$	ok?

## 22 LLTitle

### 22.1 This Is a Correct Title

#### 22.1.1 this is a wrong title

The quick brown fox jumps over the lazy dog

SubParagraph: Test With Ref 1

## 22.2 IGNORE IF ALL UPPERCASE

### 22.3 Math Contains version $x$

## 23 LLUserDefined

You can define your own rule.

<code>f^\mathrm{a}(x)</code>	$f^a(x)$	ok
<code>f^a(x)</code>	$f^a(x)$	ng

<code>f \infConv g</code>	$f \square g$	ok
<code>f \Box g</code>	$f \square g$	ng

## Appendix A LLSetBar

Detecting inappropriate use of the vertical bar  $|$  is very difficult. We are currently trying to detect the following, although not implemented yet.

<code>\lvert -1 \rvert</code>	$ -1 $	ok
<code>\abs{-1}</code>	$ -1 $	ok
<code>\vert -1 \vert</code>	$ -1 $	ng
<code> -1 </code>	$ -1 $	ng

<code>\lVert -x \rVert</code>	$\  -x \ $	ok
<code>\norm{-x}</code>	$\  -x \ $	ok
<code>\Vert -x \Vert</code>	$\  -x \ $	ng
<code>  -x  </code>	$\  -x \ $	ng

<code>\relmiddle </code> (macro)	$\left\{ a \mid a > \frac{1}{2} \right\}$	ok
<code>\mid</code>	$\{ a \mid a > \frac{1}{2} \}$	ok?
<code> </code>	$\{ a \mid a > \frac{1}{2} \}$	ng

<code>\divides</code> (MnSymbol)	$+2 \mid +4$	ok
<code>\mid</code>	$+2 \mid +4$	ok?
<code>\mathrel </code>	$+2 \mid +4$	ok?
<code>\vert</code>	$+2 \mid +4$	ng
<code> </code>	$+2 \mid +4$	ng

<code>f(y x)</code>	$f(y x)$	ok?
<code>f(y \mid x)</code>	$f(y \mid x)$	ok?
<code>f(\,y\mid x\,)</code>	$f(y \mid x)$	ok?
<code>\left. \mathrm{d}v{t} \right _{t=0} f(t)</code>	$\left. \frac{\mathrm{d}}{\mathrm{d}t} \right _{t=0} f(t)$	ok?