Useful LaTeX commands for Sage

February 24, 2014

Basic commands

You must enclose these commands in dollar signs, e.g. `$x \in \mathbb{R}$`. You can also use `\(` and `\)` as delimiters; for example, `\(x \in \mathbb{R}\)`.

LaTeX notation	concept represented	example in LaTeX	result
{…}	grouping	see below	see below
\mathrm{…}	don't italicize …	`\mathrm{next}`	next
\mathbb{…}	write … in "blackboard bold"	`\mathbb{R}`	$\mathbb{R}$
\mathbf{…}	write … in bold font	`a\mathbf{F}`	$a\mathbf{F}$
\mathcal{…}	write … in calligraphic font	`\mathcal{S}`	$\mathcal{S}$
^	superscript	`x^2`	x^2
\sqrt	square root	`sqrt{x^2+1}`	$\sqrt{x^2+1}$
_	subscript	`x_{\mathrm{next}}`	x_{next}
\in	element of	`x\in S`	$x \in S$
\{…\}	a set containing …	`\{1,5,7\}`	$\{1,5,7\}$
\frac{*a*}{*b*}	fraction of *a* over *b*	`\frac{2}{5}`	$\frac{2}{5}$
\alpha, \beta, etc.	Greek letters	`2\pi`	2π
\infty	infinity	`(-\infty,\infty)`	$(-\infty,\infty)$
\sin, \cos, etc.	properly formatted functions	`\sin(\frac{pi}{6})`	$\sin(\frac{\pi}{6})$
\rightarrow, \leftarrow, etc.	arrows	`\lim_{x\rightarrow2}`	$\lim_{x\to 2}$
\sum, \int, \prod	sum, integral, product	`\int_a^b f(x)dx`	$\int_a^b f(x)\,dx$
		`\lim_{n\rightarrow\infty} \sum_{i=1}^n f(x_i)\Delta x`	$\lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x$
\leq, \geq	$\leq, \geq$	`a\leq b`	$a \leq b$
\notin, \neq	$\notin, \neq$	`a\not\in S`	$a \notin S$
\subset, \not\subset	$\subset, \not\subset$	`S\not\subset T`	$S \not\subset T$
\ldots, \cdots	…, ⋯	`\mathbb{N}=\{1,2,\ldots\}`	$\mathbb{N} = \{1,2,\ldots\}$
\cap, \cup	intersection, union	`S\cap(T\cup U)`	$S \cap (T \cup U)$

Delimeters

If you have a complex expression, you might want the delimiters (parentheses, brackets, etc.) to grow with it. You can see this in the difference between

$$(x^{x^{x^{x^{\cdot^{\cdot^{\cdot}}}}}}) \qquad \text{and} \qquad \left(x^{x^{x^{x^{\cdot^{\cdot^{\cdot}}}}}}\right).$$

To do this, place the command `\left` or the command `\right` immediately before the delimeter. **Every `\left` must match a `\right`, but if you only want one, you can place a dot after the other to indicate that you want nothing.**

Example. The second expression above comes typing in a textbox

```
$\left( x^{x^{x^{x^{x^{\iddots}}}}} \right)$.
```

Example. You could obtain the interval $\left[2^{\ln 5}, \infty\right)$ by typing in a textbox

```
$\left[2^{\ln5},\infty\right)$.
```

That looks better than $[2^{\ln 5}, \infty)$, because the bracket and parens stretched.

Matrices

It's best to set matrix expressions on separate lines; you can do this using the delimiters `\[` ("begin math display") and `\]` ("end math display").

Matrices require a LaTeX environment, called an array. You start a matrix using the command `\begin{matrix}{`*format*`}`, and end it using the command `\end{matrix}`. For the *format*, you indicate whether you want the columns of the matrix aligned left (`l`), center (`c`), or right (`r`). You do this *for each column*, as you will see below.

Finally, you specify the entries of the matrix. Columns are separated by the ampersand (`&`), while rows are separated by a double backslash (`\\`).

Example. You can obtain the matrix

$$\begin{pmatrix} \cos x^2 - 1 & & & & x \\ & e^{2x} & & & \\ x+1 & & \sin x^2 - 1 & & \\ & 1-x & & e^{-2x} & \\ & & & x & \end{pmatrix}$$

by typing in a text box

```
\[ \left(\begin{array}{clccr}
        \cos x^{2}-1 & & & & x\\
        & e^{2x}\\
        x+1 & & & \sin x^{2}-1\\
        & 1-x & & & e^{-2x}\\
        & & & x
\end{array}\right) \]
```