

0.1 General Information

The files *math.sty* and *preamble.sty* should provide you a simple yet effective suite of macros for quick writing of mathematical/scientific papers. To properly load them you should include the following in your preamble:

```
1 \usepackage{preamble}
2 \usepackage{math}
```

It is important that you maintain the order of the packages, since *math.sty* uses some packages included in *preamble.sty*. Other than providing an extensive list of mathematical operators from *math*, there are some useful commands in *preamble.sty* too. The one that I myself use quite often is `\col{<color>}{<text>}`. Although *xcolor* defines `\textcolor`, it can get kind of "clunky" in tables or similar, so I wrote a shorter command.

0.2 Symbol Index

Symbol	Math-Mode	Result	Symbol	Math-Mode	Result
Symbol			Math-Mode		Result
<i>Vectors</i>					
Column Vector	<code>\pvec{x_1}{x_2}</code>	$\begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$	Dot-Product	<code>\dotp{x_1}{x_2}</code>	$\langle x_1, x_2 \rangle$
Column Vector					$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$
<i>Matrices</i>					
Bold faced Matrix	<code>\mat{M}</code>	M	Determinant	<code>\det</code>	det
Matrix-Rank (de)	<code>\Rang</code>	Rang	Matrix-Rank (en)	<code>\Rank</code>	Rank
Matrix-Trace (de)	<code>\Spur</code>	Spur	Matrix-Trace (en)	<code>\Trace</code>	Trace
Adjunct-Matrix	<code>\Adj</code>	Adj	Cofactor-Matrix	<code>\Cof</code>	Cof
Identity-Matrix (de)	<code>\imate</code>	E	Identity-Matrix (en)	<code>\imati</code>	I
<i>Calculus and Functions</i>					
Differential d	<code>\diff</code>	d	Divergence	<code>\divs</code>	div
Derivative	<code>\der{f}{x}</code>	$\frac{df}{dx}$	Partial Derivative	<code>\per{f}{x_1}</code>	$\frac{\partial f}{\partial x_1}$
n-th Derivative	<code>\ner{f}{x}{n}</code>	$\frac{d^n f}{dx^n}$	n-th Partial Derivative	<code>\pnr{f}{x_1}{n}</code>	$\frac{\partial^n f}{\partial x_1^n}$
Curl (de)	<code>\rot</code>	rot	Curl (en)	<code>\curl</code>	curl
Limit (noarg)	<code>\lims</code>	lim	Limit	<code>\lim{n}{\infty}</code>	$\lim_{n \rightarrow \infty}$
Infimum (noarg)	<code>\infs</code>	inf	Infimum	<code>\inf{M}</code>	$\inf(M)$
Supremum (noarg)	<code>\sups</code>	sup	Supremum	<code>\sup{M}</code>	$\sup(M)$
Limes Inferior (noarg)	<code>\liminfs</code>	lim inf	Limes Inferior	<code>\liminf{n}{\infty}</code>	$\liminf_{n \rightarrow \infty}$
Limes Superior (noarg)	<code>\limsups</code>	lim sup	Limes Superior	$\limsup_{n \rightarrow \infty}$	$\limsup_{n \rightarrow \infty}$
Function Image (de)	<code>\Bild</code>	Bild	Function Image (en)	<code>\Img</code>	Img
Area Sinus hyperbolicus			<code>\Arsinh</code>		Arsinh
Area Cosinus hyperbolicus			<code>\Arcosh</code>		Arcosh
Area Tangens hyperbolicus			<code>\Artanh</code>		Artanh
Area Cotanges hyperbolicus			<code>\Arcoth</code>		Arcoth
Arcus Cotanges			<code>\arccot</code>		arccot

<i>Logic</i>					
Bijunction	<code>\bij</code>	\leftrightarrow			
Equivalent	<code>\eqv</code>	\Leftrightarrow	Not Equivalent	<code>\neqv</code>	\nleftrightarrow
Right Subjunction	<code>\subj</code>	\rightarrow	Left Subjunction	<code>\lsubj</code>	\leftarrow
Not Right Subjunction	<code>\nsubj</code>	\nrightarrow	Not Left Subjunction	<code>\nlsubj</code>	\nleftarrow
Right Implication	<code>\implies</code>	\Rightarrow	Left Implication	<code>\limplies</code>	\Leftarrow
Not Right Implication	<code>\nimplies</code>	\nRightarrow	Not Left Implication	<code>\nlimplies</code>	\nLeftarrow
Symbol for True (de)	<code>\dtrue</code>	W	Symbol for True (en)	<code>\etrue</code>	T
Symbol for False (de)	<code>\dfalse</code>	F	Symbol for False (en)	<code>\efalse</code>	F
<i>Equations</i>					
Should be equal to	<code>\feq</code>	$\stackrel{!}{=}$			
<i>Constants</i>					
Imaginary Unit	<code>\i</code>	i	Jimaginary Unit (EE)	<code>\j</code>	j
Euler's Number	<code>\e</code>	e			
<i>Number Theory</i>					
GCD (de)	<code>\ggT</code>	ggT	GCD (en)	<code>\gcd</code>	gcd
LCM (de)	<code>\kgV</code>	kgV	LCM (en)	<code>\lcm</code>	lcm
<i>Signal Transforms</i>					
Laplace Transform	<code>\ltr{x}</code>	\bar{x}	Z Transform	<code>\ztr{x}</code>	\tilde{x}
Laplace Transform	<code>\lap{x}</code>	$\mathcal{L}\{x\}(s)$	Inverse Laplace Transform	<code>\ilap{x}</code>	$\mathcal{L}^{(-1)}\{x\}$
Z-Transform	<code>\zat{x}</code>	$\mathcal{Z}\{x\}(z)$	Inverse Z-Transform	<code>\izat{x}</code>	$\mathcal{Z}^{(-1)}\{x\}$
Fourier Transform	<code>\frt</code>	$\xleftrightarrow{\text{FT}}$			
Fourier Transform	<code>\fat{x}</code>	$\mathcal{F}\{x\}(\omega)$	Inverse Fourier Transform	<code>\ifat{x}</code>	$\mathcal{F}^{(-1)}\{x\}$
Fourier Series (de)	<code>\frr</code>	$\xleftrightarrow{\text{FR}}$	Fourier Series (en)	<code>\frs</code>	$\xleftrightarrow{\text{FS}}$
DFT	<code>\dft</code>	$\xleftrightarrow{\text{DFT}}$	DTFT	<code>\dtft</code>	$\xleftrightarrow{\text{DTFT}}$
<i>Custom TikZ-Symbols for Signal Transforms</i>					
Laplace Transform	<code>\ltrnsf</code>	$\bigcirc\text{---}\bullet$	Inverse Laplace Transform	<code>\ltransf</code>	$\bullet\text{---}\bigcirc$
Z Transform	<code>\ztransf</code>	$\square\text{---}\blacksquare$	Inverse Z Transform	<code>\Ztransf</code>	$\blacksquare\text{---}\square$
<i>Sets</i>					
Natural Numbers	<code>\N</code>	\mathbb{N}	Integers	<code>\Z</code>	\mathbb{Z}
Rational Numbers	<code>\Q</code>	\mathbb{Q}	Irrational Numbers	<code>\I</code>	\mathbb{I}
Real Numbers	<code>\R</code>	\mathbb{R}	Complex Numbers	<code>\C</code>	\mathbb{C}
Set of Primes	<code>\P</code>	\mathbb{P}	Transcendental Numbers	<code>\T</code>	\mathbb{T}
General Field (de)	<code>\K</code>	\mathbb{K}	General Field (en)	<code>\F</code>	\mathbb{F}

Table 1: All symbols and operators from math.sty

As you might have noticed, some of the entries in the table above feature either (de) or (en). These typically refer to language-dependent Operators. A classic example is the Curl of a Vector-Field. In English, the operator is either $\nabla \times \mathbf{V}$ or $\text{curl}(\mathbf{V})$. In German however, the cross-product $\nabla \times \mathbf{V}$ is referred to as *Rotation von \mathbf{V}* ¹. Hence the

¹Rotation of \mathbf{V}

Operator $\operatorname{rot}(\mathbf{V})$.

There also exist some limits which take no arguments, which is listed with (noarg). This was mostly done to provide a simple text command for just the operator. If you e.g. just want to write: *The limes superior refers to the largest ...* and want to use the symbol \limsup in text without any subscript.

0.3 A Word on Tables

Tables in L^AT_EX can be quite a pain, especially correct vertical spacing and alignment. To avoid maximum frustration, the package `cellspace` is loaded. It allows to define a minimal distance to the top and the bottom of a row. To enable this functionality in your tables, you need to modify your column-list by adding `s` in front of your column type, e.g. `\begin{tabular}{Sc s1 sr}`. **Note:** If you have `siunitx` loaded² you need to write `cc` instead.

The standard value for space to top/bottom is 4pt. You can change this by modifying the corresponding commands in `preamble.sty`:

- `\setlength\cellspacetopline` controls the spacing to the top
- `\setlength\cellspacebottomline` controls the spacing to the bottom

`preamble` also includes the `longtable` package. This allows for tables to perform pagebreak. A pagebreak can be manually inserted by typing `\pagebreak` in the table-contents. In order for this to work, the `longtable`-environment mustn't be in a `table`-environment. So wrap your `longtable` in a `center` and put the caption as a row element.

²`preamble` loads this package