0.1 General Information

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

```
\usepackage{preamble}
\usepackage{math}
```

It is important that you maintain the order of the packags, 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>}`. Altough 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
Vectors					
Column Vector	`\pvec{x_1}{x_2}`	$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$	Dot-Product	`\dotp{x_1}{x_2}`	$\langle x_1, x_2 \rangle$
Column Vector	`\tvec{x_1}{x_2}{x_3}`	$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$			
Matrices					
Matrix	`\mat{M}`	$\mathbf{M}$	Matrix (greek letters)	`\gmat{M}`	$\boldsymbol{\phi}$
Determinant	`\det`	$\det$			
Matrix-Rank (de)	`\Rang`	Rang	Matrix-Rank (en)	`\Rank`	Rank
Matrix-Trace (de)	`\Spur`	Spur	Matrix-Trace (en)	`\Trace`	Trace
Adjunct-Matrix	`\Adj`	Adj	Cofactor-Matrix	`\Cof`	Cof
Identity-Matrix (de)	`\imate`	$\mathbf{E}$	Identity-Matrix (en)	`\imati`	$\mathbf{I}$
Calculus and Functions					
Differential d	`\diff`	d	Exterior Derivative	`\extd`	D
Divergence	`\divs`	div			
Derivative	`\der{f}{x}`	$\frac{\mathrm{d}f}{\mathrm{d}x}$	Partial Derivative	`\per{f}{x_1}`	$\frac{\partial f}{\partial x_1}$
n-th Derivative	`\ner{f}{x}{n}`	$\frac{\mathrm{d}^n f}{\mathrm{d}x^n}$	n-th Partial Derivative	`\pnr{f}{x_1}{n}`	$\frac{\partial^n f}{\partial x_1^n}$
Curl (de)	`\rot`	rot	Curl (en)	`\curl`	curl
Limit (noarg)	`\lims`	$\lim$	Limit	`\lim{n}{\infty}`	$\lim\limits_{n\to\infty}$
Infimum (noarg)	`\infs`	$\inf$	Infimum	`\inf{M}`	$\inf\left(M\right)$
Supremum (noarg)	`\sups`	$\sup$	Supremum	`\sup{M}`	$\sup\left(M\right)$
Limes Inferior (noarg)	`\liminfs`	$\liminf$	Limes Inferior	`\liminf{n}{\infty}`	$\liminf\limits_{n\to\infty}$
Limes Superior (noarg)	`\limsups`	$\limsup$	Limes Superior	$\limsup\limits_{n\to\infty}$	$\limsup\limits_{n\to\infty}$
Function Image (de)	`\Bild`	Bild	Function Image (en)	`\Img`	Img
Additional Trigonometric Functions					
Area Sinus hyperbolicus	`\Arsinh`	Arsinh			

Area Cosinus hyperbolicus			`\Arcosh`		Arcosh
Area Tangens hyperbolicus			`\Artanh`		Artanh
Area Cotanges hyperbolicus			`\Arcoth`		Arcoth
Arcus Cotanges	`\arccot`	arccot			
Arcus Secans	`\arcsec`	arcsec	Arcus Cosecans	`\arccsc`	arccsc
		Logic			
Bijunction	`\bij`	$\leftrightarrow$			
Equivalent	`\eqv`	$\Leftrightarrow$	Not Equivalent	`\neqv`	$\not\Leftrightarrow$
Right Subjunction	`\subj`	$\rightarrow$	Left Subjunction	`\lsubj`	$\leftarrow$
Not Right Subjunction	`\nsubj`	$\not\rightarrow$	Not Left Subjunction	`\nlsubj`	$\not\leftarrow$
Right Implication	`\implies`	$\Rightarrow$	Left Implication	`\limplies`	$\Leftarrow$
Not Right Implication	`\nimplies`	$\not\Rightarrow$	Not Left Implication	`\nlimplies`	$\not\Leftarrow$
Symbol for True (de)	`\dtrue`	W	Symbol for True (en)	`\etrue`	T
Symbol for False (de)	`\dfalse`	F	Symbol for False (en)	`\efalse`	F
		Equations			
Should be equal to	`\feq`	$\overset{!}{=}$			
		Constants			
Imaginary Unit	`\i`	i	Jimaginary Unit (EE)	`\j`	j
Euler's Number	`\e`	e			
		Number Theory			
GCD (de)	`\ggT`	ggT	GCD (en)	`\gcd`	gcd
LCM (de)	`\kgV`	kgV	LCM (en)	`\lcm`	lcm
		Signal Transforms			
Laplace Transform	`\ltr{x}`	$\overline{x}$	Z Transform	`\ztr{x}`	$\tilde{x}$
Laplace Transform	`\lap{x}`	$\mathcal{L}\{x\}(s)$	Laplace Transform (inv)	`\ilap{x}`	$\mathcal{L}^{(-1)}\{x\}$
Z-Transform	`\zat{x}`	$\mathcal{Z}\{x\}(z)$	Z-Transform (inv)	`\izat{x}`	$\mathcal{Z}^{(-1)}\{x\}$
Fourier Transform	`\frt`	$\overset{\text{FT}}{\longleftrightarrow}$			
Fourier Transform	`\fat{x}`	$\mathcal{F}\{x\}(\omega)$	Fourier Transform (inv)	`\ifat{x}`	$\mathcal{F}^{(-1)}\{x\}$
Fourier Series (de)	`\frr`	$\overset{\text{FR}}{\longleftrightarrow}$	Fourier Series (en)	`\frs`	$\overset{\text{FS}}{\longleftrightarrow}$
DFT	`\dft`	$\overset{\text{DFT}}{\longleftrightarrow}$	DTFT	`\dtft`	$\overset{\text{DTFT}}{\longleftrightarrow}$
		Custom TikZ-Symbols for Signal Transforms			
Laplace Transform	`\ltransf`	○—●	Laplace Transform (inv)	`\Ltransf`	●—○
Z Transform	`\ztransf`	□—■	Z Transform (inv)	`\Ztransf`	■—□
		Sets			
Natural Numbers	`\N`	$\mathbb{N}$	Integers	`\Z`	$\mathbb{Z}$
Rational Numbers	`\Q`	$\mathbb{Q}$	Irrational Numbers	`\I`	$\mathbb{I}$
Real Numbers	`\R`	$\mathbb{R}$	Complex Numbers	`\C`	$\mathbb{C}$
Set of Primes	`\P`	$\mathbb{P}$	Transcendental Numbers	`\T`	$\mathbb{T}$
General Field (de)	`\K`	$\mathbb{K}$	General Field (en)	`\F`	$\mathbb{F}$

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-dependet Operators. A classic example is the Curl of a Vector-Field. In English, the operator is either $\nabla \times \mathbf{V}$ or curl($\mathbf{V}$). In German however, the cross-prodcut $\nabla \times \mathbf{V}$ ist referred to as *Rotation von* $\mathbf{V}$[1]. Hence the Operator 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 lim sup in text without any subscript.

0.3 A Word on Tables

Tables in LaTeXcan be quite a pain, especially correct vertical spacing and alignemnt. 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 Sl Sr}`. **Note:** If you have `siunitx` loaded[2] you need to write `Cc` instead.

The standard value for space to top/bottom is 4pt. You can change this by modifying the corresponging 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. See `readme.tex` for an example.

0.4 Authors Note

Since I am currently studying Information and Computer Engineering, I've only written macros for corresponding fields (i.e. electrical engineering). So currently there are no neat macros for Chemistry or advanced Physics, etc. Since this repository is public you can Issue a feature request and given some time, it should be implemented in a corresponding style.

[1] Rotation of $\mathbf{V}$

[2] preamble loads this package