

Code tips from “Introduktion til L^AT_EX”^{*}

Or just the `dlfltxbcodetips` package

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Introduction

In my L^AT_EX book (Madsen, 2007) we present some macros that might be helpful to the readers. Some of these extra macros might be useful to others as well so these macros have been included in the `dlfltxbcodetips` package. The package is published on CTAN and the package is released under the normal lpl license.

The »dlfltxb« part of the name simply stands for »daleif« and L^AT_EX book. The `dlfltxbcodetips` package is the first package in the »dlfltxb«-bundle which, over time, will contain most of the home made packages that I use to create my book (though not the book source itself).

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Some of the macros might be better of included in the `mathtools` package by Morten Høgholm, but he is quite busy elsewhere at the moment.

Note: The macro `\dbx` will often be used to simulate some text or mathematical material.

1 Extra symbols

1.1 A big version of `\times`

`\bigtimes` A few extra symbols have been created. First of is `\bigtimes` which is a large operator version of `\times`, but without having to load special fonts.¹

`\bigtimes_{n=1}^k A_n`
`\[\bigtimes_{n=1}^k A_n \]`

$$\bigtimes_{n=1}^k A_n \qquad \bigtimes_{n=1}^k A_n$$

1.2 Negated up- and downarrows

`\nuparrow` The package creates `\nuparrow` and `\ndownarrow` by rotating and reflecting `\nrightarrow` and `\nleftarrow` respectively.¹

`$ A \nuparrow B$ \quad`
`$ B \ndownarrow C$`

$$A \nrightarrow B \qquad B \nleftarrow C$$

Remark. The `mathdesign` package is incompatible with `amssymb`, but it does define the symbols we need from it to define `\nuparrow` and `\ndownarrow`. Use

```
\usepackage[noamssymb]{dfltxbcodetips}
```

to disable the autoloading of `amssymb`, and remember to load `dfltxbcodetips` *after* `mathdesign`.

2 Fun with theorems

2.1 Shaded or framed theorems with the `ntheorem` package

The `ntheorem` package can create shaded or framed theorems, but they take up to much space (in my opinion). So we make our own macro `\NewShadedTheorem`. It has exactly the same syntax as the ordinary `\newtheorem`. Requirements: the `framed`, `ntheorem` (loaded with the `framed` option), and `color` or `xcolor`. You will have to redefine `\theoremframecommand` to get a background color or a frame. This package initialises `\theoremframecommand` to do nothing.

¹Updated version due to Enrico Gregorio.

Caveat. The theorem environment constructed will not have a stored companion as `ntheorems normal \newtheorem` does.

```
\def\theoremframecommand{\fboxsep=10pt\fbox}
\NewShadedTheorem{sthm}{Theorem}[chapter]
\def\theoremframecommand{%
\colorbox{red}}
\NewShadedTheorem{slemma}{sthm}{Lemma}
\newtheorem{prop}{sthm}{Proposition}
\begin{sthm}
normal test.
\end{sthm}
\begin{slemma}
a lemma.
\end{slemma}
\begin{prop}
a theorem with no background.
\end{prop}
```

Theorem. normal test.

Lemma. a lemma.

Proposition. a theorem with no background.

2.2 Theorems that start with a list

A theorem that starts with a list looks odd because the first item comes directly after the heading.²

```
\begin{thm}
\begin{enumerate}
\item \dbx[2cm]
\item \dbx[2cm]
\item \dbx[2cm]
\end{enumerate}
\end{thm}
```

Theorem 1. 1.

2.

3.

`\InsertTheoremBreak` The macro `\InsertTheoremBreak` helps.

```
\begin{thm}
\InsertTheoremBreak
\begin{enumerate}
\item \dbx[2cm]
\item \dbx[2cm]
\item \dbx[2cm]
\end{enumerate}
\end{thm}
\begin{thm}
\InsertTheoremBreak*
\begin{enumerate}
\item \dbx[2cm]
\item \dbx[2cm]
\item \dbx[2cm]
\end{enumerate}
\end{thm}
```

Theorem 2.

1.
2.
3.

Theorem 3.

1.
2.
3.

The un-stared version remove the space above the list, the stored version does not.

²Depends on the configuration.

Caveat. If the theorem comes too close to a page break it is quite likely that the page break will end up between the theorem header and the start of the list.

3 Various features regarding alignment

3.1 Arrow between lines

Sometimes lines in an alignment are related in the sense of *from which it follows*, usually indicated by \Rightarrow . We would like to place this between the lines in a nice way. The following macro is due to Morten Høgholm.

```
\ArrowBetweenLines      \ArrowBetweenLines[\langle arrow \rangle]
\ArrowBetweenLines*     \ArrowBetweenLines*[\langle arrow \rangle]
```

Simply hold back one column of alignment for the arrow:

```
\begin{alignat}{2}
&& f(x) \& = \dbx[2cm] \\\
&\ArrowBetweenLines
&& g(x) \& = - \dbx[2cm] \\\
&\ArrowBetweenLines[\Downarrow]
&& h(x) \& = 0
\end{alignat}
```

$$\begin{array}{rcl} f(x) = \boxed{} & & (1) \\ \Updownarrow & & \\ g(x) = -\boxed{} & & (2) \\ \Downarrow & & \\ h(x) = 0 & & (3) \end{array}$$

Note the height of the arrow line and that the line automatically does not contain equation numbers. The starred version can be used to place the arrows on the right. Though several alignment columns on each line might become a problem.

```
\begin{alignat}{2}
& f(x) \& = \dbx[2cm] \\\
&\ArrowBetweenLines*
& g(x) \& = - \dbx[2cm] \\\
&\ArrowBetweenLines*[\Downarrow]
& h(x) \& = 0
\end{alignat}
```

$$\begin{array}{rcl} f(x) = \boxed{} & & (4) \\ & \Updownarrow & \\ g(x) = -\boxed{} & & (5) \\ & \Downarrow & \\ h(x) = 0 & & (6) \end{array}$$

3.2 Switch dead space

The standard *equation* environment has the feature that if the text before it is short and the formula likewise, then the drop between the preceding text and the formula will be `\abovedisplayshortskip` instead of the usual `\abovedisplayskip`. The macros from the `amsmath` package does not have this feature (except *equation**).

```

text
\[ a=b \]
text
\begin{align*}
a=b
\end{align*}

```

text	$a = b$
text	$a = b$

`\SwapDeadSpace` The macro `\SwapDeadSpace` can simulate this feature

```

text
\[ a=b \]
text
\begin{align*}
\SwapDeadSpace
a=b
\end{align*}

```

text	$a = b$
text	$a = b$

3.3 Left alignment

In [Swanson \(1999\)](#), Ellen Swanson presents some recommendations regarding how to arrange displayed formulas. One thing she recommends is alignment to the left and with all subsequent lines indented by 2 em.

	=	
=		
=		.

or

=	
=	.

or

	=	
+		
×		.

and

-	
⊗	.

But having to do all those indentations by hand quickly becomes quite dull. Instead, align everything to the left, and pull back the first line. This is what the following macro does.

`\PullBack` `\PullBack[⟨number⟩]`

The optional argument is a number (without unit, em will be used) indicating the amount of indentation. 2 em is the default. Now simply use `\PullBack` instead of the `»&«` on the first line.

```
\begin{align*}
  \PullBack f(x) + g(x) + \dbx[4cm] \\\
  &= \dbx[5cm] \\\
  &= \dbx[5cm] \\
\end{align*}
```

$$\begin{aligned} f(x) + g(x) + & \boxed{} \\ = & \boxed{} \\ = & \boxed{} \end{aligned}$$

The optional argument is usually used whenever the alignment is moved to the right of the equal signs.

```
\begin{align*}
  \PullBack[3] f(x) + g(x) + \dbx[4cm] \\\
  ={} & \dbx[5cm] \\\
  &+ \dbx[5cm] \\
\end{align*}
```

$$\begin{aligned} f(x) + g(x) + & \boxed{} \\ = & \boxed{} \\ & + \boxed{} \end{aligned}$$

3.4 Alignment with material encased in delimiters on different lines

Swanson also recommends that if one has material encased with delimiters and the delimiters are on different lines, then if space permits, the material should be indented such that the relationship is evident. Usually we would use a `\phantom` to do this, such as in the next example.

```
\begin{align*}
  \dbx[5mm]&= \dbx[5mm]\bigl[{} \dbx[3cm] \\\
  &\phantom{=}\dbx[5mm]\bigl[{} \\
  &\times \dbx[3cm]{} \\\
  &\phantom{=}\dbx[5mm]\bigl[{} \\
  &- \dbx[3cm]{} \bigr] \\\
  &= \dbx[3cm] \\
\end{align*}
```

$$\begin{aligned} \boxed{} &= \boxed{} \bigl[\boxed{} \\ &\times \boxed{} \\ &- \boxed{} \bigr] \\ &= \boxed{} \end{aligned}$$

The problem with this is that it gets tedious and prone to human error. How about instead maintaining a stack of material determining the indentation together with tools to reset, add to and pop the stack. For this you can use the following macros

```
\MathIndent      \MathIndent
\SetMathIndent   \SetMathIndent{⟨math code⟩}
\AddtoMathIndent   \AddtoMathIndent{⟨math code⟩}
\PopMathIndent   \PopMathIndent
\PopMathIndent*   \PopMathIndent*
```

Now, an illustrative example might be in order:

$$\square = \square \left[\begin{aligned} & \square \\ & + \square \\ & + \square \left\{ \square + \left(\square \right. \right. \\ & \qquad \qquad \qquad \left. + \square \right) \\ & \qquad \qquad \qquad \left. + \square \right\} \\ & + \square \end{aligned} \right]$$

Of course, non-balanced \left-\right constructions may not be used.

<code>\ProvidePGFPages-</code> <code>FourOnOneWith-</code> <code>SpaceForNotes</code>	<p>The macro <code>\ProvidePGFPagesFourOnOneWithSpaceForNotes</code> will activate a »4_{on}1_{with}space_{for}notes« layout to be used with the pgfpages package. It is basically the same as the »8_{on}1« layout but leaving the second column empty for reader to fill in their own notes.</p>
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Bibliography

Lars Madsen. Introduktion til \LaTeX . <http://www.imf.au.dk/system/latex/bog/>, 2007. The current version of the book is 3rd edition beta.

Ellen Swanson. *Mathematics into Type*. American Mathematical Society, 1999. An set of old notes, updated in 1999 by Arlene O'Sean og Antoinette Schleyer.