Next steps for breqn

Morten Høgholm

Technical University of Denmark

TUG 2009, Notre Dame University
Outline

1. What breqn does
A quick example

\begin{dmath*}
f(x) = \sum_{k=0}^{\infty} \frac{f^{(k)}(c)}{k!}(x-c)^{k}
= f(c)+f'(c)(x-c) + \frac{f''(c)}{2!}(x-c)^{2} + \frac{f^{(3)}(c)}{3!}(x-c)^{3} + \cdots
\end{dmath*}

\[ f(x) = \sum_{k=0}^{\infty} \frac{f^{(k)}(c)}{k!}(x-c)^{k} \]

\[ = f(c) + f'(c)(x-c) + \frac{f''(c)}{2!}(x-c)^{2} + \frac{f^{(3)}(c)}{3!}(x-c)^{3} + \cdots \]
Another example

\begin{dgroup*}
\begin{dmath}
f(x) = \sum_{k=0}^{\infty} \frac{f^{(k)}(c)}{k!}(x-c)^{k}
= f(c)+f'(c)(x-c)+\frac{f''(c)}{2!}(x-c)^2
+ \frac{f^{(3)}(c)}{3!}(x-c)^3+\cdots
\end{dmath}
\begin{dmath*}E=mc^2\end{dmath*}
\end{dgroup*}
Another example, cont.

\[ f(x) = \sum_{k=0}^{\infty} \frac{f^{(k)}(c)}{k!}(x - c)^k \]

\[ = f(c) + f'(c)(x - c) + \frac{f''(c)}{2!}(x - c)^2 \]

\[ + \frac{f^{(3)}(c)}{3!}(x - c)^3 + \cdots \]

\[ E = mc^2 \]

(1)
How breqn works

- Categorizing math symbols into classes
- Spacing classes — same as \TeX.
- Breaking classes. Left delimiters and right delimiters should act differently.
- Making every math character a macro: `\mathcode"8000`
What about amsmath, memoir, you name it?

Many small bug fixes to make it not break everything else, so...

- Good news! It works with amsmath.
- And memoir.
- And most other things.
- But beware of catcodes!
Problems in use

- Not all environments work as advertised
- Lacking QED support
- Interference with other packages changing document catcodes.
- Lacking proper manual overrides.
Tag placement

The tag placement is currently not exactly as desired.

- The original implementation would center tag vertically

\[ k = \frac{1}{\sqrt{\frac{2}{3}\pi}} \]  \hspace{1cm} (2)

- New algorithm tries to be a little smarter

\[ k = \frac{1}{\sqrt{\frac{2}{3}\pi}} \]  \hspace{1cm} (2)

- However, this is a little more complicated...
The line breaking

- It works most of the time
- But can occasionally produce sub-optimal results
- The algorithm just isn’t perfect.
- Needs an inspection/more detailed specification.
- Why do everything yourself? The new version of Presentation MathML contains many ideas as to how to do this.
- Get it to work properly with the paragraph shapes within \LaTeX.
Implementing the line breaking

- Currently spaghetti code
- Needs to be rewritten into a more functional/readable style
- This ought to ease maintenance!
- And also porting to other languages.
Unicode

- Difficult!
- Many things have to change under the hood
- But don’t worry – it’s already been done in the development version
Accessibility

- Also difficult!
- But since breqn reflows a math expression...
- Let’s add pdf tagging!
- Hope to commence this work soon.
Other nice things to have

- Breaking of binary operators in Slavic style
- Automatic ligatures $\sin \rightarrow \sin$.
- Automatic scaling of delimiters, i.e., do what nath does.
- In short: To make it simple for the user!
- And that it doesn’t break other packages.