Math in ConTEXt

bridging the gap with

(AMS-)LaTeX

The situation as–it–was

ConTEXt strength in text

- powerful and fancy yet easy–to–use text formatting;
- powerful and easy–to–use interaction features;
- DTP–oriented features;
- METAPOST integration.

ConTEXt weakness in math

- Little more than plain TEX math built-in.
- (history) Taco's `m-math` module brought most $\mathcal{AMS}$-LATEX features to ConTEXt, and some extra features (`breqn`).
- Overhaul of the font mechanism and other changes to core macros prevent the use of Taco's module but adds support for many of the symbol fonts available to LATEX users; a very limited number of ($\mathcal{AMS}$-)LATEX features are added to the core and to the new math module `m-newmat`.

The new math modules

Purpouse of the new modules is to:

- provide the same functionality provided by ($\mathcal{AMS}$-)LaTeX and Nath, possibly with as much ease even if not necessarily with the same syntax;
- provide as much command compatibility as possible, so that compatible commands/environments are achieved with same or very similar commands;
- (low priority) add new features without breaking anything, in the spirit of graphics and interactivity peculiar to ConTeXt;
- (low priority) ensure documents aesthetical compatibility with ($\mathcal{AMS}$-)LaTeX (for use of ConTeXt in journals etc).

Project status: Nath

Nath is almost fully implemented: the module `t-nath` is based on the original LaTeX package itself.

Side–effects of the adaptation:

- discovery of some bugs that affected the original package;
- robustness and enhancements, macro-wise (allowing for example extensible arrows in the sub- or superscript part of another extensible arrow) and engine-wise (making Nath aware of ε-TeX and therefore allowing it to typeset more complex formulas, a job which requires a noticeably large amount of registers).
- the discovery of at least one situation in which the LaTeX's "protected expansion" mechanism can achieve something which ε-TeX's enhanced macro expansion management cannot achieve (or the discovery of one more limit in my knowledge regarding TeX macro expansion, its protection and the way this is implemented in ConTeXt; whichever is most likely).

Project status: $\mathcal{AMS}$-LaTeX

Much less extensive work. $\mathcal{AMS}$-specific features implemented include a very limited set of basic environment (e.g. aligned and gathered equations) and a few classic macros (e.g. `\eqref`).

Some work on non-$\mathcal{AMS}$ commands and environments has been done, e.g. an initial implementation of `\array`. Some fonts commands which in ConTeXt where only available in text mode were brought back to math mode (e.g. `\cal`, `\frak`) with the syntax familiar to LaTeX users. This part of the module might in the future be moved to the core `m-newmat` module.

Project future

Since the Nath package provides already a wide range of features which overlap some of the $\mathcal{AMS}$-LaTeX ones.

Do we want full syntax compatibility with $\mathcal{AMS}$-LaTeX?

- ▷ **No.**

  Then we only need to implement $\mathcal{AMS}$-LaTeX features not available throught Nath, leaving more time for the implementation of new, more ConTeXtish features (interactive and/or fancy formatted formulas?)

- ▷ **Yes.**

  Then $\mathcal{AMS}$-LaTeX must be fully implemented, and care must be taken for the cases when both modules are loaded (allow switching between the two sets of command?).

Examples

Fancy some real-world examples?