

L^AT_EX News

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Introduction

This document is under construction ...

Providing `xparse` in the format

The official interface in the L^AT_EX 2_ε kernel for creating document-level commands has always been `\newcommand`. This was a big step forward from L^AT_EX 2.09. However, it was still very limited in the types of command it can create: those taking at most one optional argument in square brackets, then zero or more mandatory arguments. Richer syntaxes required use of the T_EX `\def` primitive along with appropriate low-level macro programming.

The L^AT_EX team started work on a comprehensive document-command parser, `xparse`, in the late 1990s. In the past decade, the experimental ideas it provides have been carefully worked through and moved to a stable footing. As such, `xparse` is now used to define a very large number of document and package commands. It does this by providing a rich and self-consistent syntax to describe a wide range interfaces seen in L^AT_EX packages.

The ideas developed in `xparse` are now sufficiently well-tested that the majority can be transferred into the L^AT_EX kernel. Thus the following commands have been added

- `\NewDocumentCommand`, `\RenewDocumentCommand`,
 `\ProvideDocumentCommand`,
 `\DeclareDocumentCommand`
- `\NewExpandableDocumentCommand`,
 `\RenewExpandableDocumentCommand`,
 `\ProvideExpandableDocumentCommand`,
 `\DeclareExpandableDocumentCommand`
- `\NewDocumentEnvironment`,
 `\RenewDocumentEnvironment`,
 `\ProvideDocumentEnvironment`,
 `\DeclareDocumentEnvironment`

- `\BooleanTrue` `\BooleanFalse`
- `\IfBooleanTF`, `\IfBooleanT`, `\IfBooleanF`
- `\IfNoValueTF`, `\IfNoValueT`, `\IfNoValueF`
- `\IfValueTF`, `\IfValueT`, `\IfValueF`
- `\SplitArgument`, `\SplitList`, `\TrimSpaces`,
`\ProcessList`, `\ReverseBoolean`
- `\GetDocumentCommandArgSpec`
`\GetDocumentEnvironmentArgSpec`

Most, but not all, of the argument types defined by `xparse` are now supported at the kernel level. In particular, the types `g/G`, `l` and `u` are *not* provided by the kernel code; these are deprecated but still available by explicitly loading `xparse`. All other argument types are now available directly within the $\text{\LaTeX} 2_{\epsilon}$ kernel.

A hook management system for \LaTeX

With the fall 2020 release of \LaTeX we provide a general hook management system for the kernel and for packages. This will allow packages to safely add code to various kernel and package hooks and if necessary define rules to reorder the code in the hooks to resolve typical package loading order issues. This hook system is written in the L3 programming layer and thus forms the first larger application within the kernel that makes use of the $\text{\LaTeX} 3$ functionality now available (if we discount `xparse` which was already available for a long time as a separate package).

The file `lthooks.dtx` holds the core management code for hooks and defines basic hooks for environments (as previously offered by `etoolbox`), `ltshipout.dtx` provides kernel hooks into the shipout process (making packages like `atbegshi`, etc. unnecessary) and the file `ltfilehook.dtx` holds redefinition for commands like `\input` or `\usepackage` so that they offer hooks in a similar fashion to what is provided by the `filehook` package.

At the moment the integration is lightweight, overwriting definitions made earlier during format generation (though this will change after more thorough testing). For that reason the documentation isn't in its final form either and you have to read through three different documents:

lthooks-doc.pdf Core management interface and basic hooks for environments provided by the kernel.

ltshipout-doc.pdf Hooks accessible while a page is being shipped out.

ltfilehook-doc.pdf Hooks used when reading a file.

For those who wish to also study the code, replace `-doc` with `-code`, e.g., `lthooks-code.pdf`. All documents should be accessible via `texdoc`, e.g.,

`texdoc lthooks-doc`

should open the core documentation for you.

Other changes to the \LaTeX kernel

\symbol in math mode for large Unicode values

The $\text{\LaTeX} 2_{\epsilon}$ kernel defines the command `\symbol`, which allows characters to be typeset by entering their 'slot number'. With the \LaTeX and \XeTeX engines, these slot numbers can extend to very large values to accommodate Unicode characters in the upper Unicode planes (e.g., bold mathematical capital A is slot number "1D400 in hex or 119808 in decimal). The \XeTeX engine did not allow `\symbol` in math mode for values above 2^{16} , and this limitation has now been lifted.

([github issue 124](#))

Correct Unicode value of \=y (\bar{y})

The Unicode slot for \bar{y} was incorrectly pointing to the slot for \bar{Y} . This has been corrected. ([github issue 326](#))

Add support for Unicode soft hyphens

For a long time, the UTF-8 option for `inputenc` made the Unicode soft hyphen character (U+00AD) an alias for the \LaTeX soft hyphen `\-`. The Unicode engines \XeTeX and \LuaTeX behaved different though: They either ignored U+00AD or interpreted it as an unconditional hyphen. This inconsistency is fixed now and \LaTeX always treats U+00AD as `\-`. ([github issue 323](#))

Fix capital accents in Unicode engines

In Unicode engines the capital accents such as `\capitalcedilla`, etc. have been implemented as trivial short hands for the normal accents (because other than Computer Modern virtually no fonts support them), but that failed when `hyperref` got loaded. This has been corrected. ([github issue 332](#))

Support calc in various kernel commands

The `\hspace`, `\vspace`, `\addvspace`, `\` and other commands simply passed their argument to a \TeX primitive to produce the necessary space. As a result it was impossible to specify anything other than a simple dimension value in such arguments. This has been changed, so that now `calc` syntax is also supported with these commands. ([github issue 152](#))

Spaces in filenames of included files

File names containing spaces lead to unexpected results when used in the commands `\include` and `\includeonly`. This has now been fixed and the argument to `\include` can contain file name containing spaces. Leading or trailing spaces will be stripped off but spaces within the file name are kept. The argument to `\includeonly`, which is a comma-separated list of files to process, can also contain spaces with any leading and

trailing spaces stripped from the individual filenames while the spaces *in* the file names will remain intact.
(*github issues 217 and 218*)

Avoid extra line in `\centering`, `\raggedleft` or `\raggedright`

If we aren't justifying paragraphs then a very long word (longer than a line) could result in an unnecessary extra line in order to prevent a hyphen in the second-last line of the paragraph. This is now avoided by setting `\finalhyphendemerits` to zero in unjustified settings.
(*github issue 274*)

Set a non-zero `\baselineskip` in text scripts

As `\textsuperscript` and `\textsubscript` usually contain only a few characters on a single line the `\baselineskip` was set to zero. However, `hyperref` uses that value to determine the height of a link box which consequently came out far too small. This has been adjusted.
(*github issue 249*)

Spacing issues when using `\linethickness`

In some circumstances the use of `\linethickness` introduced a spurious space that shifted objects in a `picture` environments to the right. This has been corrected.
(*github issue 274*)

Better support for the legacy series default interface

In the initial implementation of L^AT_EX's font selection scheme (NFSS) changes to any default were always carried out by redefining some commands, e.g., `\seriesdefault`. In 2019 we introduced various extensions and with it new methods of customising certain parts of NFSS, e.g., the recommended way for changing the series default(s) is now through `\DeclareFontSeriesDefault` [1]. In this release we improved the support for legacy documents using the old method was improved to cover additional edge cases.
(*github issues 306,315*)

Support for uncommon font series defaults

If a font family was set up with fairly unusual font series defaults, e.g.,

```
\renewcommand\ttdefault{lmvtt}  
\DeclareFontSeriesDefault[tt]{md}{lm}  
\DeclareFontSeriesDefault[tt]{bf}{bm}
```

then a switch between the main document families, e.g., `\ttfamily... \rmfamily` did not always correctly continue typesetting in medium or bold series if that involved adjusting the values used by `\mdseries` or `\bfseries`. This has now been corrected.
(*github issue 291*)

Checking the current font series context

Sometimes it is necessary to define commands that act differently when used in bold context (e.g., inside `\textbf`). Now that it is possible in L^AT_EX to specify different “bf” defaults based for each of the three meta families (`rm`, `sf` and `tt`) via `\DeclareFontSeriesDefault`, it is not any longer easy to answer the question “am I typesetting in a bold context?”. To help with this problem a new command was provided:

```
\IfFontSeriesContextTF{<context>}  
  {<true code>}{<false code>}
```

The `<context>` can be either `bf` (bold) or `md` (medium) and depending on whether or not the current font is recognized as being selected through `\bfseries` or `\mdseries` the `<true code>` or `<false code>` is executed. As an example

```
\usepackage{bm} % (bold math)  
\newcommand\vbeta{\IfFontSeriesContextTF{bf}%  
  {\ensuremath{\bm{\beta}}}%  
  {\ensuremath{\beta}}}
```

This way you can write `\vbeta-isotopes` and if used in a heading it comes out in a bolder version.
(*github issue 336*)

Avoid spurious package option warning

When a package is loaded with a number of options, say X, Y and Z, and then later another loading attempt was made with a subset of the options or no options, it was possible that you got an error message that option X is not known to the package. This obviously incorrect error was due to some timing issue where the list of available options got lost prematurely. This has now been fixed.
(*github issue 22*)

Adjusting `fleqn`

In `amsmath` the `\mathindent` parameter used with the `fleqn` design is a rubber length parameter allowing for setting it to a value such as `1em minus 1em`, i.e., so the the normal indentation can be reduced in case of very wide math displays. This is now also supported by the L^AT_EX standard classes.

In addition a compressible space between formula and equation number in the `equation` environment got added when the `fleqn` option is used so that a very wide formula doesn't bump into the equation number.
(*github issue 252*)

Provide `\clap`

L^AT_EX has inherited `\llap` and `\rlap` from plain T_EX (zero-sized boxes whose content sticks out to the left or right, respectively) but there isn't a corresponding `\clap` command that centers the material. This missing command was added by several add-on packages, e.g., `mathtools`, and has now been added to the kernel.

Fix to legacy math alphabet interface

When using the L^AT_EX 2.09 legacy math alphabet interface, e.g., `\sf -1` instead of `\mathsf{-1}`, an extra math Ord atom was added to the formula in case the math alphabet was used for the first time. In some cases this math atom would change the spacing, e.g., change the unary minus sign into a binary minus in the above example. This has finally be fixed.

(gnats issue latex/3357)

Added tests for format, package and class dates

To implement compatibility code or to ensure that certain features are available it is helpful and often necessary to check the date of the format or that of a package or class and execute different code based on the result. For that L^AT_EX only had some internal commands (`\@ifpackagelater` and `\@ifclasslater`) for testing package or class names but nothing really for testing the format date. For the latter one had to resort to some obscure command `\@ifl@t@r` that, given its cryptic name, was clearly never intended for use even in package or class code. Furthermore, even the existing interface commands were defective as they are testing for “equal or later” and not for “later” as their names indicate.

We have therefore introduced three new CamelCase commands as the official interface for such tests

```
\IfFormatAtLeastTF{<date>}
  {<true code>}{<false code>}
```

and for package and class tests

```
\IfClassAtLeastTF{<class name>}{<date>}
  {<true code>}{<false code>}
\IfPackageAtLeastTF{<package
name>}{<date>}
  {<true code>}{<false code>}
```

For compatibility reasons the legacy commands remain available, but we suggest to replace them over time and use the new interfaces in new code. (github issue 186)

Avoid a problem with \verb

If a user typed `\verb_!~!_foo` instead of `\verb!~!_foo` by mistake, then surprisingly the result was “!~!foo” without any warning or error. What happened was that the `_` became the argument delimiter due to the rather complex processing done by `\verb` to render verbatim. This now got fixed and spaces directly following the command `\verb` or `\verb*` are ignored as elsewhere.

(github issue 327)

Merge l3docstrip into docstrip

The file `l3docstrip.tex` offered a small extension over the original `docstrip.tex` file supporting the `%<@@=<module>` syntax of `expl3`. This has now been merged into

`docstrip` so that it can now be used both for traditional `.dtx` files and those containing code written in the L³ programming layer language. (github issue 337)

Support vertical typesetting with doc

The `macrocode` environment uses a `trivlist` internally and as part of this sets up the `\@labels` box to contain some horizontal skips, but that box is never used. As a result this generates an issue in some circumstances if the typesetting direction is vertical. This has now been corrected to support such use cases as well.

(github issue 344)

Record the counter name stepped by \refstepcounter

`\refstepcounter` now stores the name of counter in `\@currentcounter`. This allows packages like `zref` and `hyperref` to store the name without having to patch `\refstepcounter`. (github issue 300)

Native LuaT_EX behaviour for \-

L^AT_EX changes `\-` to add a discretionary hyphen even if `\hyphenchar` is set to `-1`. This change is not necessary under LuaT_EX because in there `\-` is not affected by `\hyphenchar` in the first place. Therefore this behaviour has been changed to ensure that LuaT_EX’s (language specific) hyphenation characters are respected by `\-`.

Allow \par commands inside \typeout

`\typeout` used to choke when seeing an empty line or a `\par` command in its argument. However, sometimes it is used to display arbitrary user input or code (wrapped, for example, in `\unexpanded`) which may contain explicit `\par` commands. This is now allowed. (github issue 335)

Spacing commands moved from amsmath to the kernel

Originally L^AT_EX only provided a small set of spacing commands for use in text and math, some of the commands like `\;` were only supported in math mode. `amsmath` normalized and provided all of them in text and math. This code has now been moved to the kernel so that it is generally available. (github issue 303)

command name(s)	math	text
<code>\, \thinspace</code>	<i>xx</i>	<i>xx</i>
<code>\! \negthinspace</code>	<i>xx</i>	<i>xx</i>
<code>\: \> \medspace</code>	<i>xx</i>	<i>xx</i>
<code>\negmedspace</code>	<i>xx</i>	<i>xx</i>
<code>\; \thickspace</code>	<i>xx</i>	<i>xx</i>
<code>\negthickspace</code>	<i>xx</i>	<i>xx</i>

Access raw glyphs in LuaT_EX without reloading fonts

L^AT_EX’s definitions for `\textquotesingle`, `\textasciigrave`, and `\textquotedbl` for the TU encoding in LuaT_EX need special handling to stop the shaper from replacing these characters with curly quotes. This used to be done by reloading the current font without the `tlig` feature, but that came with

multiple disadvantages: It behaves different than the corresponding X_YTeX code and it is not very efficient. This code has now been replaced with a implementation which injects a protected glyph nodes which is not affected by font shaping. (github issue 165)

Changes to packages in the graphics category

Generate a warning if existing color definition is changed

If a color is defined twice using `\DefineNamedColor`, no info text `Redefining color ... in named color model ...` is written to the log file, because of a typo in the check. This has been corrected. (gnats issue graphics/3635)

Changes to packages in the tools category

array: Support stretchable glue in w-columns

If stretchable glue, e.g., `\dotfill`, is used in `tabular` columns made with the `array` package, it stretches as it would in normal paragraph text. The one exception were `w`-columns (but not `W`-columns) were it got forced to its nominal width (which in case if `\hfill` or `\dotfill` is 0pt). This has been corrected and now `w`-columns behave like all other column types in this respect. (github issue 270)

array: Use math mode for w and W-cells in array

The `w` and `W`-columns are LR-columns very similar to `l`, `c` and `r`. It is therefore natural to expect their cell content to be typeset in math mode instead of text mode if they are used in an `array` environment. This has now been adjusted. Note that this is a breaking change in version v2.5! If you have used `w` or `W`-columns in older documents either add `>{\$}...<{\$}` for such columns or remove the `$` signs in the cells. Alternatively, you can roll back to the old version by loading `array` with

```
\usepackage{array}[v2.4]
```

in such documents. (github issue 297)

array: Fix for \firsthline and \lasthline

Replacing `\hline` with `\firsthline` or `\lasthline` could lead in some cases to an increase of the tabular width. This has now been corrected. (github issue 322)

varioref: Support Japanese as a language option

The package now recognizes `japanese` as a language option. The extra complication is that for gramatical reasons `\vrefrange` needs a structure different from all other languages currently supported. To accomodate for this `\vrefrangeformat` was added to all languages. (github issue 352)

xr: Support for spaces in filenames

The commannd `\externaldocument`, provided by `xr`, now also supports filenames with spaces, just like `\include` and `\includeonly`. (github issue 223)

Changes to packages in the amsmath category

Placement corrections for two accent commands

The accent commands `\dddots` and `\ddddots` (producing triple and quadruple dot accents) moved the base character vertically in certain situations if it was a single glyph, e.g., `\Q \dddots{Q}` were not at the same baseline. This has been corrected. (github issue 126)

Fixes to aligned and gathered

The environments `aligned` and `gathered` have a trailing optional argument to specify the vertical position of the environment with respect to the rest of the line. Allowed values are `t`, `b` and `c` but the code only tested for `b` and `t` and assumed anything else is must be `c`. As a result, a formula starting with a bracket group would get mangled without warning—the group being dropped and interpreted as a request for centering. After more than 25 years this has now been corrected. If such a group is found a warning is given and the data is processed as part of the formula. (github issue 5)

Changes to the babel package

Multilingual typesetting has much evolved in the past years, and `babel`, like L^AT_EX itself, has followed the footsteps of Unicode and the W3C consortiums to produce proper output in many languages.

Furthermore, the traditional model to define and select languages (which can be called “vertical”), based on closed files, which is still the preferred one in monolingual documents, is being extended with a new model (which can be called “horizontal”) based on *services* provided by `babel`, which allows to define and redefine locales with the help of simple `ini` files based on key/value pairs. Babel provides about of 250 of these files, which have been generated with the help of the Unicode Common Language Data Repository.

Thanks to the recent advances in `lualatex` and `luaotfload`, `babel` currently provides *services* for bidi typesetting, line breaking for South East Asian and CJK scripts, non-standard hyphenation (like `ff` to `ff-f`), alphabetic and additive counters, automatic selection of fonts and languages based on the script, etc. This means `babel` can be used to typeset such a variety of languages as Russian, Arabic, Hindi, Thai, Japanese, Bangla, Amharic, Greek, and many others.

And since these `ini` files they are easily parsable, they can serve as a source for other packages.

For further details take a look at the `babel` documentation [4].

References

- [1] L^AT_EX Project Team: *L^AT_EX 2_ε news 31*. <https://latex-project.org/news/latex2e-news/1tnews31.pdf>

- [2] *LaTeX* documentation on the *LaTeX* Project Website.
<https://latex-project.org/help/documentation/>
- [3] *LaTeX* issue tracker.
<https://github.com/latex3/latex2e/issues/>
- [4] Javier Bezos and Johannes Braams. *Babel* —
Localization and internationalization.
<https://www.ctan.org/pkg/babel>