The LaTeX 2ε *TUGboat* macros

Robin Fairbairns & TUGboat editors

1   Introduction

This is the documentation for the LaTeX 2ε macros to be used by *TUGboat* authors. The macros represent a development of the earlier ltugboat and ltugproc styles that were written for use with LaTeX 2.09; major contributors have been Robin Fairbairns, Sebastian Rahtz, Michel Goossens, Nico Poppelier and Johannes Braams. Many others have been involved, including Barbara Beeton, Karl Berry, Mimi Burbank, and the LaTeX3 team.

2   Availability

The *TUGboat* web pages are at:

https://tug.org/TUGboat

They provide **an article template**, information for authors and reviewers, and the complete run of all published *TUGboat* issues, among other things.

The macros are released for general use, and are distributed via CTAN (directory `macros/latex/contrib/tugboat`) in the usual LaTeX way as files `tugboat.dtx` and `tugboat.ins`. When the `.ins` file is processed by LaTeX, the files `ltugboat.cls` and `ltugbib.bst` (for use with articles) and `ltugcomn.sty` (a cooking pot of perhaps-useful macros, for documentation, etc.) are produced. (`ltugproc.cls` is also produced for compatibility, but is no longer used for proceedings or anything else.)

The `.dtx` file may itself be processed by LaTeX to produce a formatted (somewhat 'literate') source listing for those who would like more detailed descriptions of the *TUGboat* macros.

3   The general structure of a paper

The basic idea is to start your LaTeX document with `\documentclass{ltugboat}`, which defines the appearance of *TUGboat* articles. This uses the file `ltugboat.cls` as usual.

Each paper, therefore, is written as a document that may stand on its own. It starts with a `\documentclass` command, and its body is enclosed in a document environment. There are some options to the document class, described in the next section, but ordinarily the author needn't bother with them. The defaults are designed for creating proof copies of papers.

The proof output differs from the final production output with respect to page numbers and other material. The changes required for final production are the responsibility of the *TUGboat* editors, and the author need not be concerned with them.

4   Class options: The ltugboat class

The ltugboat class accepts many of the options of the article class (it suppresses the font-size selection and one/two-side options).

draft Set up for a draft copy of a paper (this is the default setting — the author need not explicitly set it): page numbering starts at a high number, black marks for overfull boxes.

extralabel Use the extra label-distinguishing mark in the body of the reference; see section 12.

final Set up for the final copy of a paper: page numbering to come from elsewhere, no cropmarks.

harvardcite Specify Harvard-style citation (not recommended in general; see section 12); see section 12.

noextralabel Don't use the extra label-distinguishing mark in the body of the reference; see section 12.

nonumber Sections are not numbered; section heading layout is to be as in the 'plain' tugboat styles.

numbersec Sections, subsections and subsubsections are to be numbered (this is the default setting — the author need not explicitly set it).

onecolumn Typeset article in one column.

preprint Set up for a preprint.

rawcite Explicitly specify the standard LaTeX citation method, which is the default; see section 12.

runningfull Information in both header and footer (default).

runningminimal Information in header only.

runningoff Information in neither header nor footer.

Again, normally there is no need to use any document options. They are listed here for completeness.

5   Command syntax

In general, we have sought simply to keep to the spirit of LaTeX in the commands provided by the *TUGboat* class (ltugboat).

In the few cases that it has proved possible to emulate (what seems to a staid old LaTeX programmer, such as the original author here) the gay abandon of the syntax of the 'plain' tugboat styles [6], we have done so. Nevertheless, on the whole, the new ltugboat macros define LaTeX commands and environments, or modify the definitions of LaTeX 'standard' commands. Section 14 lists equivalences between macros defined by the 'plain' package and those defined by the new package.

6   Divisions of the paper

Papers in *TUGboat* may be subdivided in the normal way of a LaTeX article (the classes are defined in terms of LaTeX's article class). Thus the author

may use `\section`, `\subsection`, ..., `\paragraph` commands (but `\part` and `\subparagraph` from article are suppressed, and `\chapter`, which doesn't even appear in the parent class, receives the same treatment).

Authors may note that the style of ordinary issues of *TUGboat* makes no distinction between the titles of the divisions; the visual style relies on the section numbers to indicate where the divisions lie in the hierarchy. If you use `\paragraph`, consider ending the paragraph label with a period; sometimes it is helpful, sometimes not.

Reference may, however, be made to the 'title' of divisions of the paper, whether they are numbered or not. The `\nameref` command (which uses the technique developed for the hyperref package [3]) permits such references; for example, the present section was introduced by:

```
\section{Divisions of the paper}
\label{sec:divs-paper}
```

and the command `\nameref{sec:divs-paper}` produces 'Divisions of the paper'.

6.1 Abstracts

The ltugboat class provides two environments for abstracts, abstract and longabstract. The abstract environment simply typesets its body as an un-numbered section whose title is 'Abstract'. The longabstract environment typesets its body in small text, and separates the abstract from the rest of the paper with a decorative line; this is rarely used.

6.2 Appendices

A paper may have appendices, which can be expressed in exactly the same way as they would be in the LaTeX article class (confusing as that may be):

```
\appendix
\section{This is appendix A}
...
\section{This is appendix B}
```

Which will produce 'section' headings similar to:

A This is appendix A

TUGboat articles may have a small extension to this format using an appendix environment:

```
\begin{appendix}
\section{This is the first one}
...
\end{appendix}
```

which will produce 'section' headings similar to:

Appendix A   This is the first one

In both cases, the subsections are numbered as normal (i.e., as 'A.n' in normal *TUGboat* papers):

7   Titles, addresses and so on

The title and author(s) of a paper are quoted using commands that are familiar (in syntax, at least) to most LaTeX users; the `\title` command is exactly that used in the standard LaTeX classes. There is also `\shortTitle{⟨your-short-title⟩}` to define the form used in running heads or footers; similarly `\shortAuthor`.

The `\author` command is used once for each co-author of the paper, and for each `\author` there should be a `\address` command that gives a (postal) correspondence address. In addition (wherever possible), *TUGboat* likes to quote an email address for authors: for this, the `\netaddress` command is used. Each author may also mention a web page, using a `\personalURL` command, and an ORCID (from `orcid.org`), using `\ORCID`.

For example, the present paper has (approximately) this at its start:

```
\title{The \LaTeXe\ \TUB{} Macros}
\author{TUGboat editors}
\address{\TeX\ Users Group}
\netaddress{tugboat@tug.org}
\personalURL{https://tug.org/TUGboat}
\maketitle
```

Lines in the title information can get quite long. If the information being given is to be typeset as ordinary text (as in the case of the `\address` line above), it can be 'wrapped' perfectly happily, as in normal text. If one of the verbatim items (`\netaddress` or `\personalURL` commands) is going to be too wide for the column, what is the author to do? (Abbreviating the text, as in the `\personalURL` above, is *not* usually an acceptable option!) Unfortunately, the `%` sign is an entirely acceptable element of both email addresses and URLs, so that the normal 'fall-back' isn't available. Therefore, the classes typeset these electronic addresses in an environment where some of the characters (notably '.' and '/') are treated as word-divisions for the purposes of laying out the line.

If the paper is the result of more than one author's labours, a sequence of `\author`, `\address`, `\netaddress` and `\personalURL` commands may be given, as in the following, which comes from a paper given at TUG'95 (abbreviated):

```
\author{Michel Goossens}
\address{CN Division, CERN\\
  ...}
\netaddress{...}

\author{Sebastian Rahtz}
\address{Elsevier Science Ltd\\
  ...}
```

```
\netaddress{...}
...
```

The class files will take care of arranging author names and addresses between the `\maketitle` and (possibly) `\makesignature` commands.

7.1 Compilation articles

Compilation articles are written as a set of contributed parts under the general editorship of the author(s) of the article. The author of the article is presented (using `\author`, etc.) in the usual way, and writes the introductory text. Each contributors' part then follows. The contributor's name is quoted in the `\contributor` command, which is an analogue of the `\author` command; contributors' `\address`, `\netaddress` or `\personalURL`. The `\contributor` command opens a group in which the contribution appears, and the contributor's signature (produced with a `\makesignature` command) closes the group. The general scheme looks like:

```
\title{Example compilation article}
\author{Robin Fairbairns}
\address{University of Cambridge ...}
\netaddress{...}
 ... introductory text ...
\makesignature

\contributor{Betsy the Dog}
\address{Romsey Town, Cambridge}
 ... Betsy's contribution ...
...
\makesignature ...
```

8 Verbatim text

For inline verbatim text, authors should ordinarily employ the facilities of LaTeX itself, that is, the `\verb` macro. This macro, of course, is highly restricted as to its usage — primarily, it may not appear in the argument of *any* other macro, even `\footnote`.

For displayed verbatim text, the classes add a small increment to the functionality of LaTeX's verbatim environment, by introducing an optional argument. The optional argument may contain commands to be executed before starting the verbatim text; the set of commands which have useful effect is strictly limited, but the following are common:

- Font size selection commands: for example, all the display verbatim in the present paper starts with `\begin{verbatim}[\small]`.
- The command `\ruled`, which is available *only* in verbatim's optional argument, and specifies that a column-wide rule should be drawn before and after the verbatim text. (This is not the recommended style in general, but it's available for when it helps.)

- The command `\makevmeta`, also available only in verbatim's optional argument, and makes the construct `!<...>` inside verbatim execute `\meta{...}`. For example,

```
\begin{verbatim}[\small\makevmeta]
The !<duration> is long ...
```

produces:

```
The ⟨duration⟩ is long ...
```

The `!` character is made a general escape character by `\makevmeta`, but `<>` are not made grouping characters.

- More generally, one of the `\make*` commands,[1] which change the category code of characters within the verbatim text. This is (of course) a facility that should only be used with the utmost caution.

Two caveats about these optional arguments:

- The search for the optional argument can be confused by the appearance of a `[` character as the first character of the displayed verbatim. An author who wishes to start verbatim text with a `[` character should provide an empty optional argument (i.e., '`[]`') to the verbatim environment.
- The *TUGboat* facility is lost when any package is loaded that also defines the verbatim environment, as discussed next.

Authors may wish to use a more featureful verbatim package, such as such as verbatim [4], listings [2], or fancyvrb [7]. This is ok; it just means the *TUGboat* optional-argument feature is not available.

If you use the listings package, please specify:

```
\lstset{columns=flexible, keepspaces=true,
        commentstyle=\slshape,
        basicstyle=\ttfamily\small}
\lstdefinestyle{inline}
        {basicstyle=\ttfamily\normalsize}
```

Explanations:

- `columns=flexible`: The other values for the `columns` option don't work well in *TUGboat*.
- `keepspaces=true`: However, having flexible columns makes spaces in the input not necessarily correspond to spaces in the output. That's usually desired, for alignment of the sources, hence `keepspaces`.
- `commentstyle=\slshape`: We prefer slanted to Computer Modern typewriter italic. Using regular upright typewriter for comments is fine too.

---

[1] `\makeescape`, `\makebgroup`, ..., `\makecomment`; used, for example, as `\makeescape\|`.

- `basicstyle=...`: We usually prefer `\small` for displayed verbatim; when using `listings`, it is necessary to reset inline verbatim to the normal text size.

9 Floating inserts

The classes do not make any change to LaTeX's built-in provision for floating inserts, so that authors may generate figures and tables just as they would in any 'normal' LaTeX document. Figure and table captions, and labels referring to them, are also substantially untouched.

However, since both classes typeset in two columns, authors must distinguish between the `figure` and `table` environments (which produce floats that are the same width as the column) and the `figure*` and `table*` (which produce floats that are the same width as the page).

10 Special-purpose typesetting

The classes define a rather large set of commands for special-purpose typesetting. Some of them are available for historical reasons only, and many are only useful in somewhat restricted circumstances. For this reason, the present paper only outlines a representative, small set of the macros.

10.1 Acronyms and logos

The classes provide macros that produce 'correct' representations of a large number of acronyms and logos; a small representative selection is shown in figure 1. The sample documents at `tug.org/TUGboat/location.html` have a more complete list, and of course the class sources are the ultimate reference.

Authors are especially urged to note the `\acro` command, which is defined in the classes. The visual appearance of all-caps sequences among normal text is rather unpleasing in Computer Modern, unfortunately. Therefore, the `\acro` command typesets its argument one point size smaller than the surrounding text: compare 'DANTE' (`\acro{DANTE}`) with 'DANTE'. Many of the provided macros merely generate calls to `\acro`; two examples, `\CTAN` and `\tug` of the list in figure 1 have already been used in the present paper.

10.2 Other special typesetting

A small list of special typesetting commands follows: a large set of such commands is defined in the classes, but the list covers most of the 'everyday' ones.

`\Dash` Typeset an em-dash, ignoring preceding and following space, surrounded by thin spaces, only breakable *after* the dash; this is

Macro	Output
`\ConTeXt`	ConTeXt
`\Cplusplus`	C++
`\CTAN`	CTAN
`\eTex`	ε-TeX
`\FAQ`	FAQ
`\HTML`	HTML
`\ISBN`	ISBN
`\KOMAScript`	KOMA-Script
`\LaTeXe`	LaTeX 2_ε
`\MacOSX`	Mac OS X
`\MathML`	MathML
`\MF`	METAFONT
`\OMEGA`	Ω
`\PDF`	PDF
`\SGML`	SGML
`\TUB`	*TUGboat*
`\TUG`	TeX Users Group
`\tug`	TUG
`\XML`	XML

Figure 1: A few of the provided acronyms and logos

the preferred method of specifying a dash in running text.

`\cs{`*cmd*`}` Typeset a control sequence name: `\cs{fred}` produces `\fred`.

`\env{`*environ*`}` Typeset the command to begin an environment: `\env{fred}` produces `\begin{fred}`.

`\meta{`*var*`}` Typeset meta-syntactic text: `\meta{fred}` produces ⟨*fred*⟩.

`\tubbraced{`*text*`}` Typeset typewriter text in typewriter braces: `\tubbraced{fred}` produces `{fred}`.

`\nth{`*n*`}` Typeset an ordinal number; `\nth{1}` is set as 1$^{\text{st}}$, `\nth{27}` is set as 27$^{\text{th}}$, and so on.

11 Use of packages

Being a TeX journal, authors may use both standard and non-standard external packages for their articles. The overriding criterion is that articles need to be processable on the *TUGboat* production computers (running current TeX Live). A sensible mechanism for submitting personal packages is by use of the `filecontents` environment. It's also fine to submit manuscript source with additional packages in a zip or other archive.

In general, packages currently on CTAN, and known to work with *current* LaTeX are likely to be fine. In particular, the team is happy to accept papers using packages that are supported by members

of the LaTeX3 team,[2] subject to the warning already mentioned (section 8): that use of the standard verbatim package eliminates the special verbatim facilities provided by the *TUGboat* classes.

TUG has a policy that macro packages described in *TUGboat* should be available for readers to use. Since typing macros from printed sources is a tedious undertaking, authors of publicly available packages are urged to submit their macros to CTAN. If a package is only available under restricted terms, authors are requested to make this fact clear when first submitting an article to the editor.

The `ltugboat` class loads the package `mflogo.sty` [5] for typesetting the METAFONT logo. (If this package is not present by some mischance, `ltugboat` will emulate its important feature.)

An additional canonically-recommended package is `url.sty` [1], for typesetting filenames, email addresses, urls, etc.; it is being used throughout the present paper (not least in the bibliography). Speaking of urls, nowadays we generally omit a leading `http://` or `https://`.

Although not necessarily recommended in all cases, many additional packages are commonly used. To mention a few: `microtype` can help reduce overfull boxes; sometimes it may be preferable to use the Latin Modern fonts via `lmodern`; `iftex` provides tests for the TeX engine being run; and `hyperref` supports live and internal hyperlinks, outlines, and many other features.

12   Bibliography

In short: our basic recommendation for handling bibliographies is to use BibTeX and the `tugboat` bibliography style. No document options are needed or recommended. All that is required in the article source (as shown in the template available from `tug.org/TUGboat`) is the following:

```
\bibliographystyle{tugboat}
\bibliography{yourbibfile}
```

If you don't have `tugboat.bst`, which was released in 2018, it's fine to use `plain` or `abbrv`. If you do have it, though, you may enjoy the following small but useful features:

- It is based on `abbrvurl.bst` (see `ctan.org/pkg/urlbst`),

- thus supports `url` and `doi` fields, among others.

- The `url` field is ignored if either the `doi` or `howpublished` field is present, since in practice we observe that people put the same information in all those fields, and we don't typeset redundant information.

- Has even more abbreviations than `abbrv`, including printing only two author names (plus "et al.") if there are more than four authors (thanks to Mico Loretan).

- Defines an `@online` entry type as an alias for `@misc`.

- For completeness only: `tugboat.bst` provides "secret" fields `newpage` to force a page break after the current item, and `urlnewline` to force a line break before the `url` value. As editors, we've found that these presentation tweaks are often necessary for the final typeset output. Authors need not worry about them.

If you use BibTeX, feel free to take advantage of the accumulated bibliography of *TUGboat* itself (`info/tugboat.bib` on CTAN), and the various compilations by Nelson Beebe in that same directory.

Bibliographies provide further problems because they're notoriously difficult to typeset at the best of times. LaTeX sets `\sloppy` when typesetting the bibliography, but this often leads to unpleasant output in the narrow columns typical of *TUGboat*. The author can control the typesetting using the command `\SetBibJustification`. The classes set `\sloppy`, by default (just like LaTeX), but the author may (for example) say:

```
\SetBibJustification{\raggedright}
```

as the present article does, to achieve somewhat better results.

A last note for references: for *TUGboat* issues, please use the format *volno*:*issno*, e.g., "*TUGboat* 32:1" for volume 32, number 1.

13   Non-recommended bibliography facilities

The preceding gives the bibliography recommendations for current *TUGboat* article. If, for whatever reason, you cannot follow the recommendation, this section is about some of the myriad historical and other possibilities.

Notwithstanding the general recommendation for the `tugboat` (falling back to `plain`) BibTeX style, *TUGboat*'s Harvard citation support may be selected by specifying `harvardcite` as an option of the `\documentclass` command.[3] If your article demands Harvard-style citations, you may prefer to load `natbib` or similar instead of using *TUGboat*'s facilities; that's ok.

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[2] Those in the LaTeX base distribution, or one of those in the `macros/latex/required` sub-tree on CTAN.

[3] The macros used derive rather directly from the 'harvard' styles written by Glenn Paulley and now maintained by Peter Williams; the BibTeX style derives from one developed by Patrick Daly.

The basic citation format is 'author(s), year', but the macros are capable of many variations: this in turn places somewhat of a load on the author to use the correct citation macro. The macros available are shown in figure 2; the figure assumes an entry in the bibliography with authors Tom, Dick, and Harry, and with a 1990 date.

Macro	Output
`\cite{key}`	(Tom, Dick, and Harry, 1990)
`\citeA{key}`	(Tom, Dick, and Harry)
`\citeNP{key}`	Tom, Dick, and Harry, 1990
`\citeANP{key}`	Tom, Dick, and Harry
`\citeN{key}`	Tom, Dick, and Harry (1990)
`\shortcite{key}`	(Tom et al., 1990)
	[also has `A` and `NP` variants]
`\citeyear{key}`	(1990)
	[also has an `NP` variant]

Figure 2: The range of citations in harvard style

Note that, if Tom, Dick, and Harry are a prolific team, there can easily be more than one reference to their work in one year. In such a case, the citations will be (Tom, Dick, and Harry, 1990a), (Tom, Dick, and Harry, 1990b), and so on. These extra 'a', 'b', etc., tags may also appear in the references section of the paper, attached to the year recorded for the reference: whether this indeed happens is controlled by the extralabel and noextralabel class options. The default state (option extralabel) attaches the extra characters.

As for BibLaTeX, we don't recommend it for *TUGboat*. If you feel you must use it, that is ok, but we may still change it to using the default LaTeX and BibTeX facilities in processing for publication if the output from BibLaTeX is problematic, as we have often seen it to be.

14   Equivalences between the 'plain' and LaTeX *TUGboat* packages

A good proportion of the commands in the 'plain' packages also appear (with the same meaning) in the LaTeX classes. Figure 3 gives a brief summary of where the macros differ significantly.

LaTeX itself makes comprehensive provision for lists; the *TUGboat* classes make no attempt to emulate the list facilities of the 'plain' macros.

The 'plain' styles' provision for verbatim text is also somewhat different from the LaTeX approach; the *TUGboat* classes offer a small subset of the extra facilities that the 'plain' styles provide; for more elaborate facilities, the user is referred to the verbatim, listings, and fancyvrb packages (see section 8).

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Plain macro	LaTeX macro
`\head`	`\section`
`\subhead`	`\subsection`
`\subsubhead`	`\subsubsection`
`\list`	itemize, enumerate, etc., environments
`\verbatim`	verbatim or `\verb`
`\figure`	figure or figure* environments

Figure 3: Equivalences between plain and LaTeX *TUGboat* macros

Of course, the syntax of commands given to the LaTeX classes is different (as discussed in section 5); arguments are (almost always) enclosed in braces, and neither of the forms of argument provision promulgated by the 'plain' macros (`\macro`⟨*argument*⟩ `\endmacro` and `\macro` * ⟨*argument*⟩ *) are provided by the LaTeX classes.

References

[1] D. Arseneau. The url package. `ctan.org/pkg/url`.

[2] C. Heinz et al. The listings package. `ctan.org/pkg/listings`.

[3] S. Rahtz, H. Oberdiek, et al. The hyperref package. `ctan.org/pkg/hyperref`.

[4] R. Schöpf. The verbatim package. `ctan.org/pkg/verbatim`.

[5] U. Vieth. The mflogo package. `ctan.org/pkg/mflogo`.

[6] R. Whitney and B. Beeton. *TUGboat* authors' guide. *TUGboat* 10(3):378–385, November 1989. `ctan.org/pkg/tugboat-plain`.

[7] T. V. Zandt et al. The fancyvrb package. `ctan.org/pkg/fancyvrb`.

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