LaTeX 2ε INPUT GUIDE FOR AUTHORS

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Dedicated to Professor XXXXXXXXXX on his XXXXXXXXXX birthday

Abstract

This guide is for authors who are preparing papers for the *Mathematical Proceedings of the Royal Irish Academy* using the LaTeX 2ε document preparation system and the MPRI class file.

1. Introduction

The layout design for the *Mathematical Proceedings of the Royal Irish Academy* has been implemented as a LaTeX 2ε class file. The MPRI class file (`mpri.cls`) is based on the ARTICLE class file as discussed in the LaTeX manual. Commands that differ from the standard LaTeX interface or that are provided in addition to the standard interface are explained in this guide. This guide is not a substitute for the LaTeX manual itself.

Note that the final printed version of papers will use a Monotype Times font rather than the Computer Modern available to most authors. Also, the measure in `mpri.cls` is different from the standard LaTeX 2ε article class. For these reasons, line and page breaks will change and authors should not insert hard breaks in their text.

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1.1. Introduction to LaTeX

The LaTeX document preparation system is a special version of the TeX typesetting program. LaTeX adds to TeX a collection of commands that allow the author to concentrate on the logical structure of the document rather than its visual layout.

LaTeX provides a consistent and comprehensive document preparation interface. LaTeX can automatically number equations, figures, tables, and list entries, as well as sections and subsections. Using this numbering system, bibliographic citations, page references and cross-references to any other numbered entity (e.g. section, equation, figure, list entry) are quite straightforward.

1.2. The MPRI document class

The use of document classes allows a simple change of style (or style option) to transform the appearance of your document. The MPRI class file preserves the standard LaTeX interface such that any document that can be produced using the standard LaTeX 2_ε ARTICLE class file can also be produced with the MPRI class file. However, the measure (or width of text) is slightly different from that for ARTICLE; therefore line breaks will change and it is possible that equations may need re-setting.

2. Using the MPRI class file

First, copy the file `mpri.cls` into the correct subdirectory on your system. The MPRI document class is implemented as a complete document class, *not* a document class option. In order to use the MPRI class file, replace `article` by `mpri` in the `\documentclass` command at the beginning of your document:

```
\documentclass{article}
```

is replaced by

```
\documentclass{mpri}
```

None of the standard document class options should be used. Author-defined macros should be inserted before `\begin{document}`, or in a separate file and should be included with the submission, see §5. Authors must not change any of the macro definitions or parameters in `mpri.cls`.

2.1. Document class options

The standard document class options should *not* be used with the MPRI class file:

- `10pt`, `11pt`, `12pt` – unavailable.
- `draft`, `twoside` (no associated style file) – `twoside` is the default.
- `fleqn`, `leqno`, `titlepage`, `twocolumn` – unavailable.
- `proc`, `ifthen`, `bezier` – can be used if necessary.

3. Additional facilities

In addition to all the standard LaTeX design elements, the MPRI class file includes the following features:

- Extended commands for specifying a short version of the title and author(s) for the running headlines.
- Title page details such as a 'Cite as follows...' line.
- Abstract environment
- Control of enumerated lists.
- An extended `theorem` environment.
- A `definition` environment.
- A `remark` environment.
- A `proof` environment.

Once you have used these additional facilities in your document, it can only be processed with `mpri.cls`.

3.1. Titles, authors' names and running headlines

In the MPRI style, the title of the article and the author's name (or authors' names) are used both at the beginning of the article for the main title and throughout the article as running headlines at the top of odd-numbered pages (rectos). The `\pagestyle` and `\thispagestyle` commands should *not* be used. Similarly, the commands `\markright` and `\markboth` should not be necessary.

Although the main heading can run to several lines of text, the running headline must be a single line. Moreover, the main heading can also incorporate new line commands (e.g. \\) but these are not acceptable in a running headline. To enable you to specify an alternative short title and author's name, the standard `\title` and `\author` commands have been extended to take an optional argument to be used as the running headline:

```
\title[A short title]{The full title, which can be as long
  as necessary}
\author[Authors' surnames]{\newauthor The full name of the
  first author\\
  first author's affiliation, then \newauthor or \and as
  described below}
```

An example will make all this clearer. To produce the title page of this document, we have used:

```
\title{\LaTeXe\ input guide for authors}

\author[Woollatt, Chadwick and Wilson]{\newauthor A.J. Woollatt$^*$\\
  Cambridge University Press, Cambridge
  \newauthor P. Chadwick\\
  School of Mathematics, University of East Anglia, Norwich
  \and N.J. Wilson\\
  City College, Norwich
}
%\email{mpria@ria.ie}        %use for single-author papers
\corresponding{mpria@ria.ie} %use for multi-author papers
```

If there is only one author, substitute `\ns` for `\newauthor`. If you have more than

one author, you use `\newauthor` for the first and subsequent authors (as above), and for the final author, use `\and`.

Unless authors state otherwise, the Royal Irish Academy will print the author's (or corresponding author's) e-mail address on the first page of each article. This should be added using either `\email` or `\corresponding`, depending on the number of authors. A raised asterisk (*) also needs to inserted immediately after the relevant author's name (see example above).

3.2. Title page details - footer

Mathematics Subject Classification information should be provided here.

Digital Object Identifiers (DOIs) and citation information will be added by the Royal Irish Academy during production of an accepted paper.

Information on authors' funding or projects supporting the authors' work should appear under 'Acknowledgements' — see below.

3.3. Dedications

A short dedication, maximum 10 words, may appear after the title and author's names and addresses and before the abstract

3.4. Abstract

Authors must supply an abstract.

The MPRI class file provides for an abstract, produced by

```
\begin{abstract}
...
\end{abstract}
```

This should appear just *before* the first `\section` command.

3.5. Lists

The MPRI class file provides the three standard list environments:

- Numbered lists, created using the `enumerate` environment.
- Bulleted lists, created using the `itemize` environment.
- Labelled lists, created using the `description` environment.

The `enumerate` environment numbers each list item with an arabic number in parentheses; alternative styles can be achieved by inserting a redefinition of the number labelling command after the `\begin{enumerate}`. For example, a list numbered with roman numerals inside parentheses can be produced by the following commands:

```
\begin{enumerate}
\renewcommand{\theenumi}{\roman{enumi}}
\item first item
       :
\end{enumerate}
```

This produces the following list:

(i) first item

(ii) second item
(iii) etc.

If your new label is so wide that it does not fit in the space available, it is possible to increase the label width. You can do this by putting the widest label as an optional argument, as you do in a bibliography environment, e.g. `\begin{enumerate}[99]`. Remember, once you have used the optional argument on the `enumerate` environment, you will not be able to process your document with a standard LaTeX 2ε class file.

3.6. Theorems

The MPRI class file has extended the standard `\newtheorem` macro to enable unnumbered theorems to be typeset with the use of the starred version. For example, you would use:

```
\newtheorem{theorem}{Theorem}[section]
\begin{theorem}
This gives me a normal numbered theorem.
\end{theorem}
\begin{theorem*}
This gives me an unnumbered theorem.
\end{theorem*}
```

to typeset the following theorems:

Theorem 3.1. *This gives me a normal numbered theorem.*

Theorem. *This gives me an unnumbered theorem.*

The new macros that follow, `\newdefinition` and `\newremark`, have the same properties, namely numbered and unnumbered versions. You can have a `\newdefinition` or a `\newremark` using the same numbering system as theorems by inserting the optional `[theorem]`, as illustrated in the following examples.

3.7. Definitions

The `\newdefinition` macro may be used for definitions. These are typeset exactly the same as theorems, except the text is in roman instead of italic. For example,

```
\newdefinition{definition}[theorem]{Definition}
  \begin{definition}
     This is a definition.
  \end{definition}
  \begin{definition*}
     This is an unnumbered definition.
  \end{definition*}
```

will typeset the following:

Definition 3.2. This is a definition.

Definition. This is an unnumbered definition.

3.8. Remarks
The `\newremark` macro may be used for remarks, examples, and the like. You use it just as you would `\newtheorem`:

```
\newremark{note}[theorem]{Note}
  \begin{note}
    This is a note.
  \end{note}
  \begin{note*}
    This is an unnumbered note.
  \end{note*}
```

The output from the above code is as follows:

Note 3.3. This is a note.

Note. This is an unnumbered note.

3.9. Placing the number first
If you would like your output to read, for example, **3.1. Theorem.**, instead of **Theorem 3.1.**, you can use the command `\reversetheorems` in the preamble of your document. This will affect the numbering of all the above three environments, `\newtheorem`, `\newdefinition` and `\newremark`.

3.10. Proof environment
The standard LaTeX constructs do not include a proof environment to follow a theorem, lemma etc., and so one has been added in the MPRI class file. Note the use in the following examples of an optional argument in square braces that may contain any information you may wish to add. For example,

```
  \begin{theorem}[Miyajima]
  \label{miyajima}
  Let the scalar function $T(x,y,t,\bmath{\omega}) $ be a conserved
  density for solutions of \textrm{(9)}. Then the two-component
  function
  \begin{equation}
  {\bmath{P}} = {\mathsf J}{\mathcal E} T
  \end{equation}
  represents the infinitesimal generator of a symmetry group
  for \textrm{(9)}.
  \end{theorem}
%
  \begin{proof}[of Theorem~\ref{miyajima}]
  The assumption about $T$ means that
  \[
```

```
0 \sim \frac{\upartial T}{\upartial t} +
{\mathcal E}T \bmath{\omega}_t
= \frac{\upartial T}{\upartial t} + \{ T, H\},
\]
where $\upartial T / \upartial t$ refers to
explicit dependence on $t$. The skew symmetry of  ${\mathsf J}$
hence implies
\begin{equation}
\frac{\upartial T}{\upartial t} \sim  \{ H, T\},
\end{equation}
whereupon the operation $\mathsf J \mathcal E$, which commutes
with $\upartial_t$ in its present sense, gives
\[
\frac{\upartial {\bmath{P}}}{\upartial t} =
{\mathsf J}{\mathcal E}\{ H, T\}.
\]
This equation reproduces the characterisation of symmetries that
was expressed by (19), thus showing ${\mathrm P}$ to represent a
symmetry group.
\end{proof}
```

will typeset the following:

Theorem 3.4 (Miyajima). *Let the scalar function $T(x, y, t, \boldsymbol{\omega})$ be a conserved density for solutions of (9). Then the two-component function*

$$\boldsymbol{P} = \mathsf{J}\mathcal{E}T \tag{3.1}$$

represents the infinitesimal generator of a symmetry group for (9).

PROOF OF THEOREM 3.4. The assumption about T means that

$$0 \sim \frac{\partial T}{\partial t} + \mathcal{E}T\boldsymbol{\omega}_t = \frac{\partial T}{\partial t} + \{T, H\},$$

where $\partial T/\partial t$ refers to explicit dependence on t. The skew symmetry of J hence implies

$$\frac{\partial T}{\partial t} \sim \{H, T\}, \tag{3.2}$$

whereupon the operation $\mathsf{J}\mathcal{E}$, which commutes with ∂_t in its present sense, gives

$$\frac{\partial \boldsymbol{P}}{\partial t} = \mathsf{J}\mathcal{E}\{H, T\}.$$

This equation reproduces the characterisation of symmetries that was expressed by (19), thus showing P to represent a symmetry group. ■

The final ■ will not be included if the `proof*` environment is used.

4. Mathematics and units

The MPRI class file will insert the correct space above and below displayed maths if standard LaTeX commands are used; for example use `\[ ... \]` and *not* `$$ ... $$`. Do not leave blank lines above and below displayed equations unless a new paragraph is really intended.

4.1. Numbering of equations

The `subequations` and `subeqnarray` environments have been incorporated into the MPRI class file. Using these two environments, you can number your equations (4.1*a*), (4.1*b*) etc. automatically. For example, you can typeset

$$a_1 \equiv (2\Omega M^2/x)^{\frac{1}{4}} y^{\frac{1}{2}} \tag{4.1a}$$

and

$$a_2 \equiv (x/2\Omega)^{\frac{1}{2}} k_y/M. \tag{4.1b}$$

by using the `subequations` environment as follows:

```
\begin{subequations}
\begin{equation}
  a_1 \equiv (2\Omega M^2/x)^{\frac{1}{4}} y^{\frac{1}{2}}
  \label{a1}
\end{equation}
and
\begin{equation}
  a_2 \equiv (x/2\Omega)^{\frac{1}{2}}k_y/M.\label{a2}
\end{equation}
\end{subequations}
```

You may also typeset an array such as:

$$\dot{X} = \gamma X - \gamma\delta\eta, \tag{4.2a}$$

$$\dot{\eta} = \tfrac{1}{2}\delta + 2X\eta. \tag{4.2b}$$

by using the `subeqnarray` environment as follows:

```
\begin{subeqnarray}
  \dot{X}    & = & \gamma X - \gamma\delta\eta ,\\
  \dot{\eta} & = & {\textstyle\frac{1}{2}} \delta + 2X\eta .
\end{subeqnarray}
```

4.2. AMS fonts – especially if you do not have them

If you need symbols from the AMS font set but do not have them installed, you can ensure that they will be correctly typeset by taking the following steps. Set up user-defined macros that can be redefined by the typesetter to use the correct AMS macros. For example, the blackboard bold symbols, sometimes called shell or

outline characters, are obtained with the AMS macro `\mathbb{..}`. Instead, use a macro definition such as:

```
% replace font!
\newcommand\BbbE{\ensuremath{\mathsf{E}}} % Blackboard bold E
```

This substitutes a sans serif character where you want blackboard bold. You can typeset the input file and the typesetter is alerted to do the substitution.

The following example (which uses the `\providecommand` macro) will work without modification by the typesetter, because the `\providecommand` macro will not overwrite any existing `\mathbb` definition.

```
\providecommand\mathbb[1]{\ensuremath{\mathsf{#1}}}
...
\newcommand\BbbE{\mathbb{E}} % Blackboard bold E
```

If you wish to use AMS fonts with LaTeX 2ε you must be using at least version 2.0. Earlier versions are not supported.

4.3. Typeface issues

Roman symbols. The mathematical operators and constants, such as sin, cos, log and exp, are covered by plain TeX macros that ensure that they are typeset in roman text, even in math mode: `\sin`, `\cos`, `\log`, `\exp`. Where single letters are concerned (e.g. d, i, e) just use the roman typeface in maths, i.e. `$E=m{\mathrm c}^2$` that typesets as $E = mc^2$, giving the correct roman character but with maths spacing. When the term involves more than one character (e.g. Re or Im) text-character spacing is required:

```
$\mbox{Re}\;x$
```

which typesets as Re x.

Where such expressions are used repeatedly, macro definitions can reduce typing and editing. The following examples are included in the preamble of the input files for this document, `MPRIAInstructions.tex`. Authors are encouraged to use them and others like them.

```
\newcommand\Real{\mbox{Re}}   % do not confuse with TeX's \Re
\newcommand\Imag{\mbox{Im}}   % do not confuse with TeX's \Im
\newcommand\Ai{\mbox{Ai}}     % Airy function
\newcommand\Bi{\mbox{Bi}}     % Airy function
```

Multiletter italic symbols. If multiletter symbols are used in maths mode, for example Reynolds, Prandtl numbers, etc. the standard maths mode spacing between them is too large and text-character spacing is required. As described in §4.3 (but here for italic letters) use for example

```
\newcommand\Rey{\mbox{\it Re}}
\newcommand\Pran{\mbox{\it Pr}}
```

Sans serif symbols. The `\textsf` and `\mathsf` commands change the typeface to sans serif, giving upright characters. Occasionally, bold-sloping sans serif is needed. You should use the following supplied macros to obtain these fonts.

`\textsf{text}`	⟶	text	`\mathsf{math}`	⟶	math
`\textsfi{text}`	⟶	*text*	`\mathsfi{math}`	⟶	*math*
`\textsfb{text}`	⟶	**text**	`\mathsfb{math}`	⟶	**math**
`\textsfbi{text}`	⟶	*text*	`\mathsfbi{math}`	⟶	*math*

You can use them like this:

```
\newcommand\ssC{\mathsf{C}}     % for sans serif C
\newcommand\sfsP{\mathsfi{P}}   % for sans serif slanted P
\newcommand\sfbsX{\mathsfbi{X}} % for sans serif bold slanted X
```

Note that the bold-slanted macros `\textsfbi` and `\mathsfbi` use the slanted sans serif font `cmssi` – because there is no bold-slanted math sans serif font in available in Computer Modern! If you use the supplied sans-serif text and math commands the typesetter will be able to substitute the fonts automatically.

Script characters. Script characters should be typeset using plain TEX's `\mathcal` command. This produces the Computer Modern symbols such as $\mathcal{E}$ and $\mathcal{F}$ in your hard copy but the the typesetter will substitute the more florid script characters normally seen in the journal.

4.4. Skewing of accents

Accents such as hats, overbars and dots are normally centred over letters, but when these are italic or sloping greek the accent may need to be moved to the right so that it is centred over the top of the sloped letter. For example, `\newcommand\hatp{\skew3\hat{p}}` will produce $\hat{p}$.

4.5. Units of measure

Numbers and their units of measure should be typeset with fixed spaces that will not break over two lines. This is easily done with user-defined macros. For example, `52\dynpercm` typesets as 52 dynes cm^{-1}, providing the following macro definition has been included in the preamble.

```
\newcommand\dynpercm{\nobreak\mbox{$\;$dynes\,cm$^{-1}$}}
```

5. User-defined macros

If you define your own macros you must ensure that their names do not conflict with any existing macros in plain TEX or LATEX 2_ε (or AMSTEX if you are using this). You should also place them in the preamble to your input file, between the `\documentclass` and `\begin{document}` commands.

Apart from scanning the indexes of the relevant manuals, you can check whether a macro name is already used in plain TEX or LATEX 2_ε by using the TEX command `show`. For instance, run LATEX 2_ε interactively and type `\show\<macro_name>` at

the TeX prompt. (Alternatively, insert the `\show` command into the preamble of an input file and TeX it.)

```
* \show\Re
```

produces the following response from TeX:

```
> \Re=\mathchar"23C.
<*> \show\Re
```

By contrast `\Real` is not part of plain TeX or LaTeX 2ε and `\show\Real` generates:

```
> \Real=undefined
<*> \show\Real
```

confirming that this name can be assigned to a user-defined macro.

Such macros must be in a place where they can easily be found and modified by the journal's editors or typesetter. They must be gathered together in the preamble of your input file, or in a separate `macros.tex` file with the command `\input{macros}` in the preamble. Macro definitions must not be scattered about your document where they are likely to be completely overlooked by the typesetter.

The same applies to font definitions that are based on Computer Modern fonts. These must be changed by the typesetter to use the journal's TeX typefaces Times and Helvetica. In this case, you should draw attention to these font definitions on the hard copy that you submit for publication and by placing a comment in your input file just before the relevant definitions, for example `% replace font!`

6. Some guidelines for using standard facilities

The following notes may help you achieve the best effects with the standard LaTeX facilities that remain in the MPRI class file.

6.1. Sections

Only the first three LaTeX section levels are defined in the MPRI class file:

Heading A – `\begin{section}`
Heading B – `\begin{subsection}`
Heading C – `\begin{subsubsection}`

There is no `paragraph` or `subparagraph` in the MPRI class file.

To obtain non-bold in a bold heading use the usual plain TeX commands for changing typeface; for example `\section{Fluctuations in Ca\textsc{ii}}`.

6.2. Tables

The `table` environment is implemented as described in the LaTeX manual to provide consecutively numbered floating inserts for tables.

The MPRI class file will cope with most table positioning problems and you should not normally use the optional positional qualifiers `t`, `b`, `h` on the `table` environment, as this would override these decisions.

The MPRI class file dictates that vertical rules should never be used within the body of the table. Extra space can be inserted to distinguish groups of rows (using

TABLE 1—An example table.

Figure	hA	hB^a	hC
2	$\exp(\pi \mathrm{i} x)$	$\exp(\pi \mathrm{i} y)$	0
3	-1	$\exp(\pi \mathrm{i} x)$	1
4	$-4+3\mathrm{i}$	$-4+3\mathrm{i}$	1.6
5	-2	-2	$1.2\mathrm{i}$

[a] A table must be inside a minipage environment if it includes table footnotes.

`\tabcolsep`) or columns (using `\jot`). Table captions must be above the table itself, so the `\caption` command should appear immediately after `\begin{table}`.

As an example, table 1 is produced using the following commands:

```
\begin{table}
\caption{An example table.} \label{sample-table}
\begin{minipage}{\textwidth}
  \tabcolsep=8pt
  \begin{tabular}{cccc}
  \hline
    {Figure} & {$hA$} & {$hB$}\footnote{A table must be
     inside a minipage environment if it includes
     table footnotes.}
     & {$hC$}\\
  \hline
    2 & $\exp\;(\upi \mathrm{i} x)$
      & $\exp\;(\upi \mathrm{i} y)$ & $0$\\
    3 & $-1$    & $\exp\;(\upi \mathrm{i} x)$ & $1$\\
    4 & $-4+3{\mathrm i}$ & $-4+3 \mathrm{i}$ & 1.6\\
    5 & $-2$    & $-2$    & $1.2 \mathrm{i}$\\
  \hline
  \end{tabular}
\end{minipage}
\end{table}
```

The `tabular` environment has been modified for the MPRI class file in the following ways:

(1) Additional vertical space is inserted above and below a horizontal rule produced by `\hline`
(2) Tables are centred, and will span the full width of the page; that is, they are similar to the tables that will be produced by using the command `\begin{minipage}{\textwidth}`.

Commands to redefine quantities such as `\arraystretch` should be omitted.

FIG. 1—An example figure with space for artwork

6.3. Illustrations (or figures)
Figures may be supplied electronically, ideally in a form that can be directly included by LaTeX. If they are supplied as encapsulated PostScript files, they must have tight bounding boxes.

Alternatively, artwork may be supplied separately as hard copy to be lettered and sized by the Printer. An approximate amount of space should be left, using the `\vspace` command.

The MPRI class file will cope with most figure positioning problems and you should not normally use the optional positional qualifiers `t`, `b`, `h` on the `figure` environment, as this would override these decisions. Figure captions should be below the figure itself, therefore the `\caption` command should appear after the space left for the illustration within the `figure` environment. For example, figure 1 is produced using the following commands:

```
\begin{figure}
  \vspace{50pt}
  \caption{An example figure with space for artwork}
  \label{sample-figure}
\end{figure}
```

6.4. Acknowledegments
Acknowledgments should appear at the close of your paper, just before the list of references and any appendices. You should use either the `acknowledgement` or `acknowledgements` environment, which will give you the ACKNOWLEDGEMENT or ACKNOWLEDGEMENTS headings respectively.

6.5. Appendices
You should use the standard LaTeX `\appendix` command to place any Appendices, normally, just before the references. This numbers appendices as A, B etc., equations as (A1), (B1) etc., and figures and tables as A1, B1 etc.

6.6. References
As with standard LaTeX, there are two ways of producing a list of references; either by compiling a list (using a `thebibliography` environment), or by using BibTeX with a suitable bibliographic database.

References in the text. References in the text are given by author in the form [1] and for multiple citations, [5, 6]. Each entry has a key, which is assigned by the author and used to refer to that entry in the text. It is essential to add the number

of bibliography entries into the curly braces, in this example we have 6 entries, so we say `\begin{thebibliography}{6}`. If you forget to do this, the labels will fall into the margin.

The list of references. The following listing shows some references prepared in the style of the journal; the code produces the references at the end of this guide. **Give full titles of journals — abbreviations are not acceptable.**

```
\begin{thebibliography}{6}

\bibitem{Dingle}
R.B. Dingle, 1973 \textit{Asymptotic expansions: their
derivation and interpretation}. London. Academic Press.

\bibitem{Olveras}
F.W.J. Olver, 1974 \textit{Asymptotics and special
functions}. New York. Academic Press.

\bibitem{OlverEx}
F.W.J. Olver, 1993 Exponentially-improved asymptotic
solutions of ordinary differential equations I:
The confluent hypergeometric function. \textit{SIAM Journal
on Mathematical Analysis\/} \textbf{24}, 756--67.

\bibitem{Olverae}
F.W.J. Olver, 1994 Asymptotic expansions of the
coefficients in asymptotic series solutions of linear
differential equations. \textit{Methods and Applications of
Analysis\/} \textbf{1}, 1--13.

\bibitem{Paris}
R.B. Paris, 1992 Smoothing of the Stokes phenomenon
using Mellin--Barnes integrals. \textit{Journal of Computational
and Applied Mathematics\/} \textbf{41}, 117--33.

\bibitem{Whittaker}
E.T. Whittaker, and G.N. Watson, 1927 \textit{A course of
modern analysis\/} (4th edn). London. Cambridge University Press.
```

Each entry takes the form

```
\bibitem{cross-reference tag}
  Bibliography entry
```

References

[1] R.B. Dingle, 1973 *Asymptotic expansions: their derivation and interpretation.* London. Academic Press.

[2] F.W.J. Olver, 1974 *Asymptotics and special functions*. New York. Academic Press.
[3] F.W.J. Olver, 1993 Exponentially-improved asymptotic solutions of ordinary differential equations I: The confluent hypergeometric function. *SIAM Journal on Mathematical Analysis* **24**, 756–67.
[4] F.W.J. Olver, 1994 Asymptotic expansions of the coefficients in asymptotic series solutions of linear differential equations. *Methods and Applications of Analysis* **1**, 1–13.
[5] R.B. Paris, 1992 Smoothing of the Stokes phenomenon using Mellin–Barnes integrals. *Journal of Computational and Applied Mathematics* **41**, 117–33.
[6] E.T. Whittaker, and G.N. Watson, 1927 *A course of modern analysis* (4th edn). London. Cambridge University Press.

Appendix A. Special commands in `mpri.cls`

The following is a summary of the new commands, optional arguments and environments that have been added to the standard LaTeX user-interface in creating the MPRI class file.

New commands

`\author`	use \\ to start the affiliation
`\ns`	to add a name space after 'By' when there is only one author.
`\newauthor`	to start first author's name if there is more than one author, and for all author's names except the last.
`\and`	to start the last author's name.
`\email`	produces '*E-mail:' – use for single-author papers
`\corresponding`	produces '*Corresponding author, e-mail:' – use for multi-author papers
`\titlefootnote`	for acknowledgements at the foot of the title page.
`\communicated`	for a 'Communicated by...' line.
`\removebrackets`	removes the '( )' brackets from the optional argument of environments created by the `\newtheorem`, `\newdefinition` and `\newremark` commands. Should be placed just before the appropriate environment.
`\reversetheorems`	to put theorem/definition/remark numbers first, e.g. **3.1. Theorem.**
`\newremark`	used as `\newtheorem` to define environments. For remarks, examples, etc.
`\newdefinition`	for definitions.
`\nosectioneqnreset`	stops `\section` commands resetting the `equation` counter. It also redefines `\theequation` to give output in the form (1) (equation) and not (1.1) (section.equation).

New optional arguments

`[<short title>]`	in the `\title` command: to define a shorter title to be used in the running head.
`[<short author>]`	in the `\author` command: to define authors' surnames to be used in the running head.
`[<widest label>]`	in `\begin{enumerate}`: to ensure the correct alignment of numbered lists with wide labels.

New environments

`newtheorem*`	an unnumbered version of newtheorem.
`newdefinition`	this environment works like the `theorem` environment; it typesets a bold heading but differs from a theorem by using roman text.
`newdefinition*`	as above, but unnumbered.
`newremark`	this environment works like the `theorem` environment; but typesets an italic heading followed by roman text.
`newremark*`	as above, but unnumbered.
`proof`	to typeset mathematical proofs.

New environments continued

`proof*`	to typeset mathematical proofs without the terminating proofbox.
`subeqnarray`	enables equation numbers in an array to be numbered as (6.1a), (6.2b), etc.
`subequation`	enables consecutive equations to be numbered (6.1a), (6.1b), etc.
`tabular`	has been modified to insert additional space above and below an `\hrule` and the table caption and body is centred with rules full out across the text measure.
`acknowledgement`	to typeset an ACKNOWLEDGEMENT heading.
`acknowledgements`	to typeset an ACKNOWLEDGEMENTS heading.

Appendix B. Notes for editors

This appendix contains additional information that may be useful to those who are involved with the final production stages of an article. Authors, who are generally not typesetting the final pages in the journal's typeface (Monotype Times), do not need this information.

Catchline commands. To be placed in the preamble:

- `\date{}`
- `\pubyear{}`
- `\volume{}`
- `\no{}`
- `\pagerange{}`

Footnotes. If a footnote falls at the bottom of a page, it is possible for the footnote to appear on the following page (a feature of TeX). Check for this.

Font substitution. Check for use of AMS fonts, bold slanted sans serifs, and bold math italic and alter preamble definitions to use the appropriate AMS and Monotype fonts for phototypesetter output.

Font sizes. The MPRI class file defines all the standard LaTeX font sizes. For example:

- `\tiny` – This is tiny text.
- `\scriptsize` – This is scriptsize text.
- `\footnotesize` – This is footnotesize text.
- `\indexsize` – This is indexsize text.
- `\small` – This is small text.
- `\tablebody` – This is tablebody text.
- `\abstractsize` – This is abstractsize text.
- `\normalsize` – This is normalsize text (default).
- `\large` – This is large text.
- `\Large` – This is Large text.
- `\LARGE` – This is LARGE text.

All these sizes are summarized in Table 2.

TABLE 2—Type sizes for LaTeX size-changing commands.

Name	Size(pt)	Usage
`\tiny`	5/6	–
`\scriptsize`	7/8	–
`\footnotesize`	8/10	index, footnotes, references
`\indexsize`	8/9	received line, catchline.
`\small`	9/10	quote, quotations, figure captions.
`\tablebody`	9/11	table body size.
`\abstractsize`	10/10	abstracts.
`\normalsize`	10/12	main text size, title, author, A, B and C heads, table captions.
`\large`	11/13	A head, part no.
`\Large`	14/18	–
`\LARGE`	17/19	–
`\huge`	20/25	–
`\Huge`	25/30	–