Instructions for Contributors to the European Journal of Applied Mathematics

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This file provides instructions for authors submitting papers to EJAM. These instructions are arranged in the style of a submitted paper so that the LaTeX file can be used as a template for submissions. As all accepted papers will be imported into typesetting software by Cambridge University Press, there is no need for authors to spend unnecessary time formatting their papers to match the appearance of the final published article. However, authors must follow rules expressly specified in this document (such as how references should be formatted). All papers must begin with an abstract of not more than 300 words and they should end with a brief concluding section. Please avoid footnotes if possible. The SI system of units must be used throughout. There is no formal restriction on length, but short papers are likely to appear sooner than longer ones (over 20 typeset pages) which are likely to be subject to delay.

Key Words: Authors should include up to five 'key subject categories', listed in order of importance, taken from the Mathematics Subject Classification
(see https://zbmath.org/static/msc2020.pdf).

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1 Introduction

EJAM is a journal for original work in areas of mathematics in which an understanding of the application requires the use of new and interesting mathematical ideas. EJAM focuses on the high level of mathematics inspired by real world applications, and at the same time fostering the development of theoretical methods with broad areas of applicability.

The journal encourages the submission of two types of papers, described below.

- Research papers

Research papers may be in any area of applied mathematics, with especial emphasis on new mathematical ideas relevant to modelling and analysis in modern science and technology and the development of interesting mathematical methods of wide applicability. There is no restriction in the scope or style of mathematics as long as the content is

presented to be as accessible as possible to the entire community of mathematicians and mathematical scientists. This applies in particular to the Introduction and conclusion. Standard mathematical techniques will only be published if they are associated with novel applications or lead to substantial advances in established problem areas.

- Survey papers

Survey papers aim to bridge the gap between academia and industry by presenting mathematical methods relevant to industry in its broadest sense, ranging from manufacturing to finance, telecommunications to biotechnology, and describing industrial problems of interest to mathematicians. Coverage includes reviews of techniques in relation to industrial application, new problem areas for which mathematical models and techniques are not yet available, comparison of solution methods, and descriptions of modelling approaches.

2 Submission of manuscripts

Submission of a paper is taken to imply that it has not been previously published and that it is not being considered for publication elsewhere. Authors of articles published in the journal assign copyright to Cambridge University Press (with certain rights reserved) and you will receive a copyright assignment form for signature on acceptance of your paper.

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The system will allow authors to benefit from faster review and earlier online publication. The system will accept PDF files; most other file types will be automatically converted into PDF. Source files will be required for any paper accepted for publication. Authors who are unable to submit online should contact the editorial office at:

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The LaTex 2e file ejm.cls and the guide ejamguide2015.tex are available from the EJAM instructions for contributors page at:

`http://journals.cambridge.org/action/displaySpecialPage?pageId=7588`

In case of any difficulties obtaining these files please contact ejam@cambridge.org

3 Layout of manuscripts

3.1 Theorems

The EJM style provides an extended `\newtheorem` command which enables you to typeset unnumbered theorems. For example:

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

Theorem *This gives me an unnumbered theorem.*

The preferred numbering scheme is for theorems to be numbered within sections, as 1.1, 1.2, 1.3, etc., but other numbering schemes are permissible and may be implemented as described in the LaTeX manual. In order to allow authors maximum flexibility in numbering and naming, *no* theorem-like environments are defined in `ejm.cls`. Rather, you have to define each one yourself. Theorem-like environments include Theorem, Definition, Lemma, Corollary, and Proposition.

3.2 Definitions

The `\newdefinition` command can be used to create environments for claims, conjectures, examples, problems, remarks, etc. These are typeset in the way as theorems, except the text is typeset in roman instead of italic.

You can have an environment created by `\newdefinition` number in the same sequence as a 'Theorem' by adding the optional `[theorem]` argument.

Definition 3.2 This is a definition.

Definition This is an unnumbered definition.

3.3 Proof environment

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

Theorem 3.3 (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 3.3 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 EJM 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 EJM class file (see §**??** regarding the `subequations` environment). Using these two environments, you can number your equations (4.1 *a*), (4.1 *b*) etc. automatically. For example, you can typeset

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

and

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

by using the `subequations` environment You may also typeset an `array` such as:

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

by using the `subeqnarray` environment You can do something more complex with these environments. Here follow a few examples of manipulating equation numbers which may be useful. First, you may wish to manipulate individual lines in a `subeqnarray`

$$M_1 = a_1 z^3 + b_1 z\rho^2 + \ldots, \quad M_2 = a_2 z^3 + b_2 z\rho^2 + \ldots, \tag{4.3 a,b}$$
$$M_3 = a_3 z^3 + b_3 z\rho^2 + \ldots, \quad M_4 = c_4\rho^3 + d_4\rho z^2 + \ldots, \tag{4.3 c,d}$$
$$M_5 = c_5\rho^3 + d_5\rho z^2 + \ldots, \quad M_6 = c_6\rho^3 + d_6\rho z^2 + \ldots, \tag{4.3 e,f}$$
$$M_7 = c_7\rho^3 + d_7\rho z^2 + \ldots, \quad M_8 = a_8 z^3 + b_8 z\rho^2 + \ldots, \tag{4.3 g,h}$$
$$M_9 = a_9 z^3 + b_9 z\rho^2 + \ldots, \quad M_{10} =_{10} \rho^3 + d_{10}\rho z^2 + \ldots. \tag{4.3 i,j}$$

Second, you may wish to have a `subeqnarray`

$$\dot{X} = \gamma X - \gamma\delta\eta, \tag{4.4 a}$$
$$\dot{\eta} = \tfrac{1}{2}\delta + 2X\eta. \tag{4.4 b}$$

followed by another `subeqnarray`

$$\dot{X} = \gamma X - \gamma\delta\eta, \tag{4.4 c}$$
$$\dot{\eta} = \tfrac{1}{2}\delta + 2X\eta. \tag{4.4 d}$$

followed by an `equation`

$$K \sim (A + \hbar A_1 + \hbar^2 A_2 + ...) \exp(-I_{\text{class}}/\hbar). \tag{4.4 e}$$

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	1.2i

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

At some point, you will need to reset everything back to normal

$$\Psi(a, \psi^A) = C \exp(-3a^2/\hbar) + D \exp(3a^2/\hbar)\psi_A \psi^A. \tag{4.5}$$

5 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 EJM style.

5.1 Sections

LaTeX provides five levels of section headings, only four of which are defined in the EJM class file:

Heading A – `\section{...}`
Heading B – `\subsection{...}`
Heading C – `\subsubsection{...}`
Heading D – `\paragraph{...}`

There is no `subparagraph` heading in the EJM style.

To obtain non-bold in a bold heading use the usual LaTeX 2_ε commands for changing typeface; for example `\section{Fluctuations in Ca\textsc{\textmd{ii}}}`.

5.2 Tables

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

The EJM class 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. Table captions should appear before the body of the table; therefore you should place the `\caption` command before the `\begin{tabular}`.

The EJM style dictates that vertical rules should never be used within the body of the table.

The `tabular` environment has been modified for the EJM style in the following ways:

(1) Additional vertical space is inserted above and below a horizontal rule produced by `\hline`

Figure 1. An example figure with space for artwork.

(2) Tables are centred, and span the full width of the page; that is, they are similar to the tables that would be produced by `\begin{tabular*}{\textwidth}`.

Commands to redefine quantities such as `\arraystretch` should be omitted. If the old tabular facilities are needed, there is a new environment, `oldtabular`, which has none of the reformatting; it should be used in exactly the same way.

5.3 Illustrations (or figures)

If preparing your manuscript in Word wherever possible figures should be produced and incorporated into the text using a standard LaTeXcompatible package; they will be reproduced *with* the author's lettering.

The EJM style 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:

If a figure caption is too long to fit on the same page as its illustration, the caption may be typeset as 'Figure X. For caption see facing page.', and the longer caption typeset at the bottom of the facing page. Authors should not concern themselves unduly with such details, and may leave pages long.

5.4 Colour figures

Colour figures may be published at no charge in the online edition. If you request colour figures in the printed version, you will be contacted by CCC-Rightslink who are acting on our behalf to collect Author Charges. Please follow their instructions in order to avoid any delay in the publication of your article.

5.5 Acknowledgements

Acknowledgements should appear at the close of your paper, just before any appendices and the list of references. Use the `acknowledgement` or `acknowledgements` environment, which will also typeset the appropriate section heading.

5.6 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. Figures and tables number as A1, B1 etc.

5.7 References

The Harvard system of references is preferred. References should be listed in alphabetical order at the end of the main text. Please include the article title in the reference, which should be in the order: author's surname, initials; year in parentheses; article title; journal name, abbreviated in accordance with the World List of Scientific Periodicals (4th Edn); volume number (underlined); inclusive page numbers.

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.

5.7.1 *Citations in the text*

Any of the following three ways of citing a 1992 paper by A. European may be used: European (1992); European [Eu]; or European [7]. In the second case, the reference at the end of the text should be preceded by [Eu], and in the third by [7].

5.7.2 *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.

```
\begin{thebibliography}{9}
\bibitem{Dingle}
\textsc{Dingle, R.~B.} 1973 \textit{Asymptotic expansions: their
derivation and interpretation}. London. Academic Press.

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

\bibitem{OlverEx}
\textsc{Olver, F.~W.~J.} 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}
\textsc{Olver, F.~W.~J.} 1994 Asymptotic expansions of the
coefficients in asymptotic series solutions of linear
```

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differential equations. \textit{Methods and Applications of
Analysis} \textbf{1}, 1--13.

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

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

References should be listed alphabetically by author name(s) and then by year if the same author has several papers.

Formatting for italic etc. should be avoided unless you are sure you understand the style of references; please concentrate on giving full and clear information.

6 Proof Reading

Typographical or factual errors only may be changed at proof stage. The publisher reserves the right to charge authors for correction of non-typographical errors. No page charge is made.

7 Incremental Publishing and DOIs

The European Journal of Applied Mathematics now publishes articles incrementally online (at Cambridge Journals Online: journals.cambridge.org) as soon as author corrections have been completed and before they join a printed issue. A new reference has now been added to the first page of the article in the journal catchline. This is the DOI–The Digital Object Identifier. This is a global publishers' standard. A unique DOI number is created for each published item. It can be used for citation purposes instead of volume, issue and page numbers. It therefore suits the early citation of articles which are published on the web before they have appeared in a printed issue.

8 Offprints

No paper offprints will be supplied. Each author will have access to electronic offprints in pdf form.

9 Author Language Services

Cambridge recommends that authors have their manuscripts checked by an English language native speaker before submission; this will ensure that submissions are judged at

peer review exclusively on academic merit. We list a number of third-party services specialising in language editing and / or translation, and suggest that authors contact as appropriate. Use of any of these services is voluntary, and at the author's own expense.

Appendix A Special commands in `ejm.cls`

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

New commands

`\affiliation`	use after `\author` to typeset the author affiliation(s). Do not use a `\\` comamnd in `\author` to start an affiliation (as in the standard LaTeX styles).
`\and`	to typeset 'and' before the last author's name.
`\ls`, `\ns`	to add letterspacing in authors' names.
`\newtheorem`	this is enhanced so that you can produce unnumbered versions of the environments by using the `*` form. e.g. `\begin{theorem*}`.
`\newdefinition`	this environment works like the `\newtheorem` command, except it produces environments which are typeset in roman instead of italic. Again unnumbered 'definitions' can be typeset using the `*` forms.
`\returnthesubequation`	restores original definition of `\thesubequation`.
`\slabel`	correctly 'labels' equation lines within a `subeqnarray` environment.
`\useAMSsubequations`	allows you to use the `subequations` environment from the `amstex`/`amsmath` packages (if you use them).
`\nbcite`	works in the same way as the normal `\cite` command except it doesn't put in the '[ ]'s.
`\proofbox`	typesets a proof box □ (this is normally put in automatically at the end of the `proof` environment).

New environments

`acknowledg(e)ment(s)`	to typeset the acknowledgments section.
`bottomfigure`	for split figures and captions (on facing page).
`proof`	to typeset mathematical proofs.
`proof*`	to typeset mathematical proofs without the terminating proofbox.
`subeqnarray`	enables equations in an array to be numbered as (6.1 *a*), etc.
`subequations`	enables consecutive equations to be numbered (6.1 *a*), etc.
`oldtabular`	the `tabular` environment 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.

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 a shorter version of the 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.

References

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

[2] Olver, F. W. J. (1974) *Asymptotics and Special Functions.* New York. Academic Press.

[3] Olver, F. W. J. (1993) Exponentially-improved asymptotic solutions of ordinary differential equations I: The confluent hypergeometric function. *SIAM Journal on Mathematical Analysis* **24**, 756–67.

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[6] Whittaker, E. T. & Watson, G. N. (1927) *A Course of Modern Analysis* (4th edn). Cambridge University Press.