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RESEARCH ARTICLE

Instructions for Contributors to the European Journal of Applied Mathematics: LaTeXGuidelines for authors

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Abstract
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 250 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.

1. Introduction

The layout design for the *European Journal of Applied Mathematics* journal has been implemented as a LaTeX style file. The EJAM style file is based on the ARTICLE style as discussed in the LaTeX manual. Commands which differ from the standard LaTeX interface, or which are provided in addition to the standard interface, are explained in this guide. This guide is not a substitute for the LaTeX manual itself.

1.1. Introduction to LaTeX

The LaTeX[2] document preparation system is a special version of the TeX typesetting program. LaTeX adds to TeX a collection of commands which simplify typesetting by allowing 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. There are simple-to-use commands for generating a table of contents, lists of figures and/or tables, and indexes. LaTeX can automatically number list entries, equations, figures, tables, and footnotes, as well as parts, chapters, sections and subsections. Using this numbering system, bibliographic citations, page references and cross references to any other numbered entity (*e.g.* chapter, section, equation, figure, list entry) are quite straightforward.

[1]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).
[2]To know more information about LaTeX and its packages, try https://ctan.org/?lang=en

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1.2. The EJAM document class

The use of document class allows a simple change of style (or style option like if DTMColor is removed from `\documentclass` then the layout will be in B/W) to transform the appearance of your document. The CUP EJAM class file preserves the standard LaTeX interface such that any document which can be produced using the standard LaTeX ARTICLE style can also be produced with the EJAM style. However, the fonts (sizes) and measure of text is slightly different from that for ARTICLE, therefore line breaks will change and it is possible that equations may need re-setting.

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.

Manuscripts for consideration for the European Journal of Applied Mathematics should be submitted electronically, using the Editorial Manager system at:

`http://www.edmgr.com/ejam/default.aspx`

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:

`ejam@cambridge.org`

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

3. Layout of manuscripts

3.1. Theorems

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

Theorem 3.1. *This gives me a normal numbered 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 `ejam.cls`. Rather, you have to define each one yourself. Theorem-like environments include Theorem, Definition, Lemma, Corollary, and Proposition.

3.2. 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 EJAM 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 3.2 (Miyajima)**.** *Let the scalar function $T(x, y, t, \omega)$ be a conserved density for solutions of (9). Then the two-component function*

$$P = \mathsf{J}\mathscr{E}T \tag{1}$$

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

Proof of Theorem 3.2. The assumption about T means that

$$0 \sim \frac{\partial T}{\partial t} + \mathscr{E}T\omega_t = \frac{\partial T}{\partial t} + \{T, H\},$$

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

$$\frac{\partial T}{\partial t} \sim \{H, T\}, \tag{2}$$

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

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

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. Additional facilities

In addition to all the standard LaTeX design elements, the EJAM style includes the following feature:

- Extended commands for specifying a short version of the title and author(s) for the running headlines.

Once you have used this additional facility in your document, do not process it with a standard LaTeX style file.

4.1. Titles authors' names and affiliation

In the EJAM 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 every page. The title is used on odd-numbered pages (rectos) and the author's name appears on even-numbered pages (versos). Although the main heading can run to several lines of text, the running head line must be a single line.

To enable you to specify an alternative short title and author's name, the standard `\righttitle` and `\lefttitle` commands have been used to print the running headline. If more authors has to be used in `\author` command then each authors should be captured in separate `\author` command. Author name in author command should be full name. **Eg:** Stephen King Wilson not Stephen K. W. `\affil` command is used to call the affiliation, if more affiliations has to be used in `\affil` command then each affiliations should be captured in separate `\affil` command.

```
\lefttitle{LaTeX\ Supplement}
\righttitle{Journal of Functional Programming}
  \title{The full title which can be as long
   as necessary}
\begin{authgrp}
  \author{Author's name}
  \affil{the affiliation if necessary}
\end{authgrp}
```

4.2. Abstract

The EJAM style provides for an abstract which is produced by the following commands

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

4.3. Lists

The EJAM style provides the three standard list environments.

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

5. Some guidelines for using standard facilities

The following notes may help you achieve the best effects with the EJAM style file.

5.1. Sections

LaTeX provides five levels of section headings and they are all defined in the EJAM style file:

- `\section`.
- `\subsection`.
- `\subsubsection`.
- `\paragraph`.
- `\subparagraph`.

Section numbers are given for sections, subsection and subsubsection headings.

5.2. Running headlines

As described above, the author's name (or author's names) should be used as running headline at the top of every page. The journal title is used on odd-numbered pages (rectos) and the author's name appears on even-numbered pages (versos).

The `\pagestyle` and `\thispagestyle` commands should *not* be used. Similarly, the commands `\markright` and `\markboth` should not be necessary.

5.3. Tables

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

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

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

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

5.4. 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 EJAM 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

Table 1. *Results of Overloading for 3 Experimental Setups. This sample table caption to show how it will display.*

Program	Expt.	CPU	RelCPU	GC	Mem	RelMem
8 Queens	(a)	2 88	1 00	6	1 7M	1 00
	(b)	32 51	11 29	193	48 9M	28 76
	(c)	7 90	2 74	42	11 3M	6 65
Primes	(a)	4 89	1 00	19	5 3M	1 00
	(b)	47 54	9 72	204	54 5M	10 28
	(c)	10 08	2 06	47	13 0M	2 45
Nfib	(a)	21 65	1 00	161	40 4M	1 00
	(b)	221 65	10 24	1382	349 0M	8 64
	(c)	21 30	0 98	161	42 0M	1 03
KWIC	(a)	7 07	1 00	15	6 3M	1 00
	(b)	34 55	4 89	109	47 8M	7 59

Figure 1. *An example figure with space for artwork..*

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.

6. Mathematics and units

The EJAM class file will centre displayed mathematics, and will insert the correct space above and below 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.

`amsmath.sty` is common package to handle various type math equations. The amsmath descriptions are available in the document can be find in the web link `https://ctan.org/pkg/amsmath?lang=en`

6.1. Numbering of equations

The `subequations` and `subeqnarray` environments have been incorporated into the EJAM class file. Using these two environments, you can number your equations (3a), (3b) etc. automatically. For example, you can typeset

$$a_1 \equiv (2\Omega M^2/x)^{\frac{1}{4}} y^{\frac{1}{2}} \tag{3a}$$

and

$$a_2 \equiv (x/2\Omega)^{\frac{1}{2}} k_y/M. \tag{3b}$$

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

$$\dot{X} = \gamma X - \gamma\delta\eta, \tag{4a}$$
$$\dot{\eta} = \tfrac{1}{2}\delta + 2X\eta. \tag{4b}$$

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`

$$M_1 = a_1 z^3 + b_1 z\rho^2 + \ldots, \quad M_2 = a_2 z^3 + b_2 z\rho^2 + \ldots, \tag{5a,b}$$
$$M_3 = a_3 z^3 + b_3 z\rho^2 + \ldots, \quad M_4 = c_4\rho^3 + d_4\rho z^2 + \ldots, \tag{5c,d}$$
$$M_5 = c_5\rho^3 + d_5\rho z^2 + \ldots, \quad M_6 = c_6\rho^3 + d_6\rho z^2 + \ldots, \tag{5e,f}$$
$$M_7 = c_7\rho^3 + d_7\rho z^2 + \ldots, \quad M_8 = a_8 z^3 + b_8 z\rho^2 + \ldots, \tag{5g,h}$$
$$M_9 = a_9 z^3 + b_9 z\rho^2 + \ldots, \quad M_{10} =_{10} \rho^3 + d_{10}\rho z^2 + \ldots. \tag{5i,j}$$

Second, you may wish to have a `subeqnarray`

$$\dot{X} = \gamma X - \gamma\delta\eta, \tag{6\,a}$$
$$\dot{\eta} = \tfrac{1}{2}\delta + 2X\eta. \tag{6\,b}$$

followed by another `subeqnarray`

$$\dot{X} = \gamma X - \gamma\delta\eta, \tag{6\,c}$$
$$\dot{\eta} = \tfrac{1}{2}\delta + 2X\eta. \tag{6\,d}$$

followed by an `equation`

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

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

$$\Psi(a, \psi^A) = C\exp(-3a^2/\hbar) + D\exp(3a^2/\hbar)\psi_A\psi^A. \tag{5}$$

6.2. 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.

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.

7. 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.

8. 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.

9. Offprints

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

10. 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.

10.1. Bibliography

As with standard LaTeX, there are two ways of producing a bibliography; either by compiling a list of references by hand (using a `thebibliography` environment) and contributors are encouraged to format their list of references style outlined in section 10.1.2 below.

As with standard LaTeX, there are two ways of producing a bibliography; either by compiling a list of references by hand (using a `thebibliography` environment), or by using BibTeX with a suitable bibliographic database with the bibliography style provided with the EJAM-UserGuide.tex like `\bibliographystyle{EJAMlike}`. The EJAMlike.bst will produce the bibliography which is similar to EJAM style but not exactly. If any modification has to be made with EJAMlike.bst can be adjusted during manuscript preparation but the updated bst file should be given along with source files. However, contributors are encouraged to format their list of references style outlined in section 10.1.2 below.

Run the bibtex to output the sample bibliography from given sample.bib file using the command the `\bibliographystyle{EJAMlike}\bibliography{Sample}`

10.1.1. References 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].

References in the text are given by reference number. Whichever method is used to produce the bibliography, the references in the text are done in the same way. Each bibliographical entry has a key, which is assigned by the author and used to refer to that entry in the text. There is one form of citation – `\cite{key}` – to produce the reference number. Thus, [1] is produced by

```
\cite{Dingle}.
```

`natbib.sty` is common package to handle various reference and its cross citations. The natbib descriptions are available in the document can be find in the web link `https://ctan.org/pkg/natbib?lang=en`

10.1.2. List of references

The following listing shows some references prepared in the style of the journal.

```
\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
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}
```

Appendix

A. Special commands in `EJAM.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 EJAM class file.

New commands

`\affil`	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).
`\newtheorem`	this is enhanced so that you can produce unnumbered versions of the environments by using the `*` form. e.g. `\begin{theorem*}`.
`\useAMSsubequations`	allows you to use the `subequations` environment from the `amstex/amsmath` packages (if you use them).
`\qed`	typesets a proof box □ (this is normally put in automatically at the end of the `proof` environment).

New environments

`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

`\righttitle`	in the `\title` command: to define a shorter title to be used in the running head.
`\lefttitle`	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.

B. Notes for editors

This appendix contains additional information which 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.

B.1. Setting the production typeface

The global `\documentclass` option '`prodtf`' sets up `EJAM.cls` to typeset in the production typeface – Monotype Times. e.g.

Table 2. *Type sizes for LaTeX size-changing commands.*

Size	Size/Baseline	Usage
`\tiny`	5/6	–
`\scriptsize`	7/8	–
`\small`	8/10	–
`\footnotesize`	8/10	footnotes, figure captions, bibliography, tables and quotes/extracts.
`\normalsize`	10/12	main text size, A, B, C and D headings, author names and table captions.
`\large`	12/14	part number (parts are not normally used).
`\Large`	14/18	–
`\LARGE`	17/21	article title and part title.
`\huge`	20/25	–
`\Huge`	25/30	–

B.2. Catchline and date commands

To be placed in the preamble; for example:

- `\jnlDoiYr{2022}`
- `\doival{10.1017/xxxxx}`
- `\jnlPage{1}{8}`

B.3. 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.

B.4. Font substitution

Check for use of AMS fonts, bold slanted sans serif, and bold math italic and alter preamble definitions to use the appropriate AMS/CUP/Monotype fonts for phototypesetter output.

B.5. Font sizes

The EJAM 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.
- `\small` – This is small text.
- `\normalsize` – This is normalsize text (default).
- `\large` – This is large text.
- `\Large` – This is Large text.
- `\LARGE` – This is LARGE text.
- `\huge` – This is huge text.
- `\Huge` – This is HUGE text.

All these sizes are summarized in Table 2.

B.6. Landscape material

The add on package `rotating.sty` provides macros for landscape figures and tables. See the `rotating.sty` guide for further information.

B.7. Other useful macros

- The `\tfrac` and `dfrac` macros are defined to give text style and display style fractions. These commands work in the same way as `\frac`.

C. Conclusion

Some Conclusions here.

Funding statement. This research was supported by grants ....

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.

References

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