

INSTRUCTIONS FOR AUTHORS ON HOW TO USE THE AMCS L^AT_EX CLASS

FIRST NAME LAST NAME ^{a,b}, SECOND AUTHOR ^{a,*}, THIRD AUTHOR ^{a,b}, FOURTH AUTHOR ^b,
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This document describes how to use the `amcs` class with L^AT_EX2_ε to produce papers suitable for publication in the *International Journal of Applied Mathematics and Computer Science (AMCS)*. The title of the paper should be unambiguous and understandable, and reflect the contents of the article. The entire paper should be 8–12 pages long (subject to excess page charges), while the abstract to be included here must be composed as one paragraph up to 200 words long. Please make the abstract concise and avoid incorporating mathematical formulae (they may pose problems in online presentations). Note that the abstract should clearly but briefly present the contents of the paper, without references to bibliography, figures and tables, or acronyms. Please bear in mind that in many databases abstracts are key elements representing the actual work.

Keywords: keyword 1, keyword 2, ..., keyword 5. Please provide a few keywords (3–5) and keep them specific.

1. Introduction

The `amcs.cls` document class is designed to produce papers suitable for publication in the *International Journal of Applied Mathematics and Computer Science*. It is based on the standard `article` L^AT_EX2_ε class. To properly format the text, the following standard packages are additionally required: `times`, `amsmath`, `amssymb`, `color`, `graphicx`, `caption2` with the option `hang`, `harvard` with the options `dcucite` and `abbr`. Other packages are optional and can be used when required.

Please note that no modifications in the original `amcs.cls` file are allowed. If needed, the authors may include additional definitions and packages in the main paper file. These, however, should not collide with the *AMCS* style. Also, any extra definitions or packages that are not actually used in the paper should be removed from the document preamble. The same refers to the text—the authors are asked not to include unnecessary commented passages in it.

*Corresponding author

2. Title page

The title area is created using the `\maketitle` command. Before invoking this command, the author has to declare all objects required to appear in the title area.

2.1. Manuscript title. An example title is declared as follows:

```
\title{Numerical analysis of the algorithm}.
```

The title is used to format the headers of odd pages. The header of each odd page is left justified and the page number right justified. In the case of a very long title, please use its short version, e.g., the first few words of the title and an ellipsis. The authors can put the short title of the paper in square brackets as an optional parameter of the `\title` command, e.g.,

```
\title[Numerical analysis ...]{Numerical  
analysis of the algorithm}.
```

2.2. Authors' names and affiliations. The authors' names and affiliations are declared with two types of commands. By default, `\author` along with `\address`

is used. Here, each author can be assigned at most two institutions:

```
\author[ad1][ad2]{Author's NAME}.
```

If an author is assigned one institution only, the second square brackets should be empty:

```
\author[ad1][]{Author's NAME}.
```

For each author, a separate `\author` command should be run, e.g.,

```
\author[ad1][]{First Author's NAME}
\author[ad2][]{Second Author's NAME}.
```

Important! The `\author` command permits to declare at most six authors.

To define an author's affiliation, the `\address` command can be used:

```
\address[ad1]{First affiliation}.
```

The option in square brackets is mandatory in order to assign an author to this institution. For each institution, a separate `\address` command should be run, e.g.,

```
\address[ad1]{First affiliation}
\address[ad2]{Second affiliation}.
```

Important! The `\address` command permits to declare at most six institutions.

Please note that the corresponding author for the paper must be marked as

```
\correspondingauthor{Author's NAME}.
```

Another option is `\authors` along with `\addresses`. These may be used **only** for more than six authors or more than two institutions per author. Please note that here care must be taken while associating given symbols with names, and these must be Latin lower case characters. Here the corresponding author is marked with the `\thanks` command, as exemplified in the commented preamble passage above.

Note that in all cases at least one institution must be declared for each author!

Important! The corresponding author should be chosen carefully—his or her task will include contact and cooperation with the Editorial Office, representing the co-authors and ensuring communication between all parties involved.

2.3. Abstract and keywords. The abstract text is encapsulated within the `abstract` environment:

```
\begin{abstract}
The paper deals with ...
\end{abstract}.
```

The list of keywords is defined using the `keywords` environment:

```
\begin{keywords}
keyword1, keyword2, keyword3 ...
\end{keywords}.
```

2.4. Header of the title page. The header of the title page contains the name of the journal and the following information:

- Publication year, declared with the `\Year{}` command;
- Journal volume number, declared with the `\Vol{}` command;
- Journal issue number, declared with the `\No{}` command;
- Paper final page numbering, declared with the `\Startpage{}` and `\Endpage{}` commands, respectively;
- Digital Object Identifier number, declared with the `\DOI{}` command.

These commands are used solely by the editorial staff, so the authors are asked to ignore them.

3. Headers

The header of each even page includes names and initials as well as the page number. To declare the authors' names, please use the `\Runauthors{}` command placed in the document preamble (before `\maketitle`). For one author, give the first name initial and the full last name, e.g., for John Doe, the appropriate form is

```
\Runauthors{J. Doe}.
```

For two authors, use both authors' names, e.g.,

```
\Runauthors{J. Doe and M. John}.
```

For more than two authors, use the first author's name and "*et al.*", e.g.,

```
\Runauthors{J. Doe \it{et al.}}.
```

The header of each odd page contains the title of the paper and the page number. To declare the header of each odd page, please use the `\title` command (see Section 2.1).

4. Sections

Sections are defined in a common way by the commands `\section`, `\subsection`, `\subsubsection` and `\paragraph`. Arabic numbers are used for subsequent numbering. A paragraph is a section without a number. Below are examples of section formatting:

4.1. Secondary heading. Section text.

4.1.1. Tertiary heading. Section text.

Paragraph. Section text.

5. Floating material

5.1. Figures. Figures are defined in a standard manner, e.g.,

```
\begin{figure}[!b]
\centering
\includegraphics[width=0.45\textwidth]
{fig1}
\caption{Figure example.}
\label{fig1}
\end{figure}.
```

They should be centred and placed at the top or bottom of a page if possible, as close as possible to the first reference to them. Please avoid middle in-text placement (option h), and do not introduce frames around the figures. To use the `\includegraphics` command, the `graphicx` package has to be loaded first. The caption of a figure is placed below the figure to which it refers and should be ended with a full stop. In the case of multiple-part figures, enumerate each piece as (a), (b), etc., including necessary descriptions in the main caption of the figure. Use the `caption` command with the `caption2` package to format figure captions. Make sure you always employ \LaTeX commands for figure captions and numbering instead of incorporating those into the original graphics.

Sometimes figures are too wide to fit in a single column. Then, a double-column figure environment declared with the `figure*` environment can be used:

```
\begin{figure*}[!t]
\centering
\includegraphics[width=0.405\textwidth]
{fig2a}\hspace{0.5cm}
```

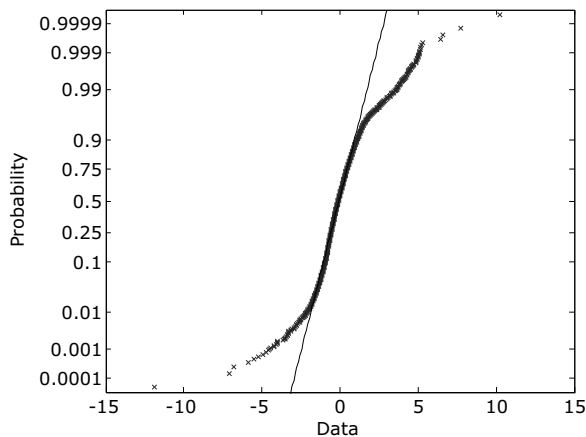


Fig. 1. Figure example (Haykin, 1999).

```
\includegraphics[width=0.45\textwidth]
{fig2b}\\
(a)\hspace{7cm}(b)
\caption{Sample figure: the first
graph (a), the second graph (b).}
\label{fig2}
\end{figure*}.
```

When referring to figures, the abbreviation “Fig.” should be used. It is also advisable to clearly name the graphic files and their labels, e.g., *fig1*, *fig2a*, *fig2b*, etc.

5.2. Tables. Tables should be centred, at the top or bottom of a page if possible, and as close as possible to the first reference to them. The caption of a table should be placed over the table to which it refers and should be ended with a full stop. For example, the code

```
\begin{table}[!b]
\centering
\caption{Table example.}
\label{table1}
\begin{tabular}{|c|c|c|}
\hline
Algorithm & Performance [%] & Calc. time [s]
\\ \hline
gradient & 95 & 100\\
stochastic & 97 & 80\\
evolutionary & 99 & 500\\ \hline
\end{tabular}
\end{table}
```

refers to Table 1. For long tables, please use the `table*` environment.

6. Graphics

Graphics should be composed in **vector format as gray scale** encapsulated postscript (EPS) or portable document format (PDF) files. Vector images allow good reproduction of graphics both online and in print, are not affected by resizing and take up little space. Therefore, line drawings should be originally composed as vector graphics, while mixed/photographic images may be exported to the EPS/PDF format with the resolution of at least 300 dpi. Please note that we will not be able to drastically improve graphics that are originally of low quality, so the authors are expected to ensure the best possible graphical presentation of their results. (Blurred, pixelated or scanned images will not be accepted!)

Table 1. Table example.

Algorithm	Performance [%]	Calc. time [s]
gradient	95	100
stochastic	97	80
evolutionary	99	500

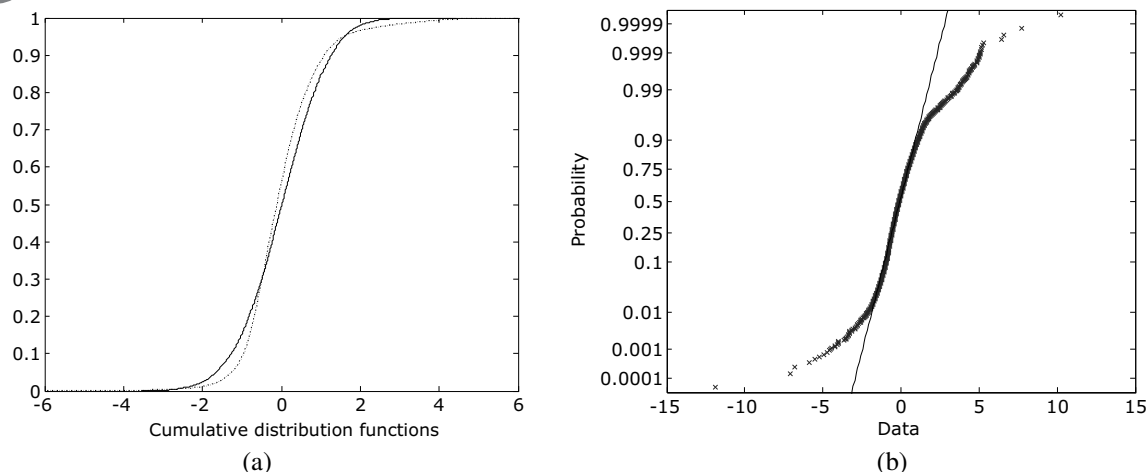


Fig. 2. Sample figure: the first graph (a), the second graph (b).

Any text used in the images should be converted to curves or composed using embedded PostScript Type 1 fonts—this will ensure correct displaying of the figures in the final PDF file. Please do NOT use the `psfrag` option in your graphics—instead, incorporate all descriptions into the actual image.

Important! As AMSC is entirely a monochrome publication, the provided graphics must be in gray scale—any images submitted in colour will be converted to such. Consequently, no in-text references to colour in graphics are allowed. (If needed, readers may be provided with colour graphics via links or contact with the authors—a proper notification should be included in the paper.) Also, please make sure that any fine line drawings such as graphs are legible in gray scale—use fairly thick lines, contrasting shades of gray or symbols.

Be aware that figures, along with abstracts, keywords and tables, often make a first impression about the entire paper, so please make them informative and clean.

7. Equations

Equations may be typeset with traditional commands such as `\equation`, `\eqnarray`, etc., but the use of the `\amsmath` and `\amssymb` packages is recommended. Each equation should be centred and numbered consecutively, starting from 1. Use arabic numbering in brackets, right justified. Please add (if appropriate) punctuation marks at the end of the formulae, e.g.,

$$J = \sum_{i=1}^N (e_i - y_i^s)^2. \quad (1)$$

Important! Please avoid double-column equations.

8. Theorems and other environments

The `amcs` document class offers a number of environments to declare theorems and related structures.

8.1. Theorems, corollaries, propositions and lemmas.

The following piece of code:

```
\begin{theorem}{Reference}
Theorem definition xxxxx xxxx xxx xxx xxx
xxx xxx xxx xxx xx xx xxxxx xxx xxxxxx xxx.
\label{theorem1}
\end{theorem}
```

results in Theorem 1, where reference to a suitable work is given in the brackets.

Theorem 1. (Werbos, 1974) *Theorem definition xxxxx xxxxx xxx xxx xxx xxx xxx xxx xxx xxx xxx xxx.*

When referencing is not needed, please leave the curly brackets empty, e.g.,

```
\begin{theorem}{}
Theorem definition xxxxx xxxx xxx xxx xxx
xxx xxx xxx xxx xx xx xxxxx xxx xxxxxx xxx.
\label{theorem2}
\end{theorem}.
```

The result of the above is as follows:

Theorem 2. *Theorem definition xxxxx xxxxx xxx xxx xxx xxx xxx xxx xxx xxx xxx xxx.*

Instead of a reference, a name can be given to the theorem. In much the same way, lemma, corollary, statement and proposition environments are declared.

8.2. Proof environment.

Proofs are handled by the environment

```
\begin{proof}{Reference/Name}
  Proof of theorem xxx xxx xxx xxx xx xx
  xxx xxx xxx xxx xxxxx xx xx xxx xx xx xxx
\end{proof},
```

which results in

Proof. (See Uciński, 1999) Proof of theorem xxx xxx xxx
xxx xxx xx xx xxx xxx xxx xxxxx xx xx xxx xx xx
xxx, ■

with an optional parameter for a reference or a name, which may be left empty if not needed. The Q.E.D. symbol ■ is automatically placed at the end of each proof.

8.3. Example environment.

Examples are declared by the environment

```
\begin{example}[] {Stability}
  Let us consider an example ... xxx xxx
  xxx xxx xxx xx xx xxx xxx xxx xxx
  xxxxx x xx xx xxxxx xx xx xxx
\end{example},
```

which results in

Example 1. (*Stability*) Let us consider an example ...
xxx xxx xxx xxx xxx xx xx xxx xxx xxx xxx xxx x xx
xx xxx xx xx xxx. ♦

The symbol ♦ is automatically placed at the end of each example. If this sign is not required, please put the `nosign` option in the brackets, i.e.,

```
\begin{example}[nosign] {Stability}
  Proof of theorem xxx xxx xxx xxx xxx xx xx
  xxx xxx xxx xxx xxxxx xx xx xxx xx xx xxx
\end{example}.
```

8.4. Definitions, problems, remarks and others.

The following piece of code:

```
\begin{definition}{Definition name}
  Contents of definition xxxxx xxx xxx xxx
  xxx xxx xxx xxx xx xx xxx xxx xxxxx xxx.
  \label{definition1}
\end{definition}
```

results in Definition 1, with the name of the definition given in the brackets.

Definition 1. (*Equivalence rule*) Contents of definition
xxxxx xxx xxx xxx xxx xxx xxx xx xx xxx xxx
xxxxx xxx.

When the name is not needed, please leave the curly brackets empty, e.g.,

```
\begin{definition}{}
  Let  $x(t)$  be ...xxx xxx xxx xxx xx xx
  xxx xxx xxx xxx xxxxx xx xx xxx xx xx xxx
\end{definition}.
```

Instead of a name, reference to a suitable work can be given in the brackets. In much the same way, remark, observation, assumption, property and problem environments are declared.

9. Algorithms

The algorithms should be expressed using the `algorithmic` and `algorithm` environments provided by the `algorithmic.sty` and `algorithm.sty` packages, respectively. The `algorithmic` environment allows describing algorithms while the `algorithm` environment provides a float wrapper for defined algorithms described using the `algorithmic` one. The following piece of code:

```
\begin{algorithm}[!h]
\caption{Selection of the point.}
\begin{algorithmic}[1]
\REQUIRE  $d_1, d_2, \psi$ 
\IF  $\{d_2 > \psi^2\}$ 
\STATE  $a_1 := d_1, a_2 := \psi^2$ 
\COMMENT{region I}
\ELSIF  $\{d_1 \geq 2\psi\}$ 
\STATE  $a_1 := 2\psi, a_2 := \psi^2$ 
\COMMENT{region II}
\ENDIF
\RETURN  $a_1, a_2$ 
\COMMENT{Returns coordinates}
\end{algorithmic}
\end{algorithm}
```

gives the result portrayed below.

Algorithm 1. Selection of the stationary point.

Require: d_1, d_2, ψ
1: **if** $d_2 > \psi^2$ **then**
2: $a_1 := d_1, a_2 := \psi^2$ {region I}
3: **else if** $d_1 \geq 2\psi$ **then**
4: $a_1 := 2\psi, a_2 := \psi^2$ {region II}
5: **end if**
6: **return** a_1, a_2 {Returns coordinates}

Algorithms expressed in a step-by-step manner can be defined in the following way:

```
\begin{algorithm}[!h]
\caption{Robust model designing.}
\label{a:alg1}
\textbf{Step 1.} Compute the residual
 $r = y - y_m$ .
```

```
\smallskip
\textbf{Step 2.} Collect the data
 $\{u_i, r_i\}_{i=1}^N$  and identify
an error model using these data.
```

```
\smallskip
\textbf{Step 3.} Construct a robust
model.
\end{algorithm},
```

which gives Algorithm 2.

Algorithm 2. Robust model designing.

Step 1. Compute the residual $r = y - y_m$.

Step 2. Collect the data $\{u_i, r_i\}_{i=1}^N$ and identify an error model using these data.

Step 3. Construct a robust model.

Algorithms formatted in a different manner cannot be accepted.

10. Acknowledgments

The acknowledgment section is created using the `acknowledgment` environment:

```
\begin{acknowledgment}
  The authors wish to thank ... xx xxx xx x
  xx xx xxx xxx xxx xxx xxxxxx xx xx xxxx xx
\end{acknowledgment}.
```

Acknowledgments and other unnumbered sections have the title centered.

Please use this section to acknowledge all and any kinds of support your research has obtained.

11. References

Authors should provide complete, correct and properly structured references. All data in a reference must be correct and exhaustive. Please cite the full title of a journal or the full name of a conference, not an abbreviation (e.g., not *IEEE Tran. N. Networks* but *IEEE Transactions on Neural Networks*, not *ACC 2007* but *American Control Conference 2007*). Journal publications should contain volume and issue numbers as well as the page range. Book chapters must be accompanied with the book title and editors, publisher and publication city, as well as page numbers. Conference publications should include the conference location (city and country) and page numbers. Alternatively, if published in books, they should be structured as book chapter entries described above. We advise you to insert DOIs where applicable for unambiguous referencing. Note, also, that the proper form

of records is particularly important for cross-referencing in electronic databases!

To prepare the bibliography using BibTeX, the harvard style with the options `dcucite` and `abbr` as well as the `dcu` bibliography style should be used. It is an author–date type of citations and offers the following useful options employed in our publications:

- `\cite{Reference name}` for parenthetical references, i.e., when they constitute extraneous information:

As has been observed (Haykin, 1999; Reinelt *et al.*, 2002; Maryak and Chin, 2001) ...

- `\citeasnoun{Reference name}` for textual references, i.e., when they constitute a logical part of the sentence:

As observed by Patan *et al.* (2008), Uciński (1999) and Parker (1985) ...

- `\citeaffixed{Reference name}{affix}` for parenthetical references containing additional introductory elements:

As has been observed (e.g., Werbos, 1974; Patan and Korbicz, 2004; DAMADICS, 2004) ...

- `\citeyear{Reference name}` for multiple references to works by the same author:

As observed by Uciński (1999; 2005a; 2005b) ...

The list of references should be ordered alphabetically according to the first author's last name. Publications by the same author(s) should be listed chronologically starting with the least recent item. Works by the same author(s) published in the same year are differentiated with *a, b*, etc., as in the example above.

12. Biographies

The authors of accepted papers are expected to provide biographical notes, concisely describing their professional standing, achievements and interests.

Biographies are created using the `biography` environment, which supports an optional argument for the inclusion of a photo:

```
\begin{biography}[photo.eps]{Author's Name}
.
.
.
\end{biography}.
```

The photo area is 2.5 cm wide and 3 cm long. The author's name is a mandatory parameter and it is written in bold face. The biography should consist of one paragraph not longer than 100 words, while photo images should be prepared with a 300 dpi resolution, as gray scale EPS or

Author without a photo. Place a brief biography here xxx xxx xxxxx
 xx xxx xxx xxx xx xxxxx xx xxxxxx xxx xxx xx xx xxxxx xx xxx
 xxx xxx xxxxx xx xxx xxx xxx xx xxxxx xx xxxxxx xxx xxx xx xx
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 xx xx xxxxx xx xxxxx.

Appendix A

Convergence analysis

A1. Section name

A1.1. Subsection name. The convergence of the algorithm ... xx xx xxx xxx xxx xxx xxxxxx xx xx xxxxx
 xx xx xxx xx xxx xxx xxx xx xx xxx xxx xxx xxx xxxxxx
 xx xx xxxxx xx xx xxx.

$$a = v + m, \quad (A1)$$

$$b = m + n. \quad (A2)$$

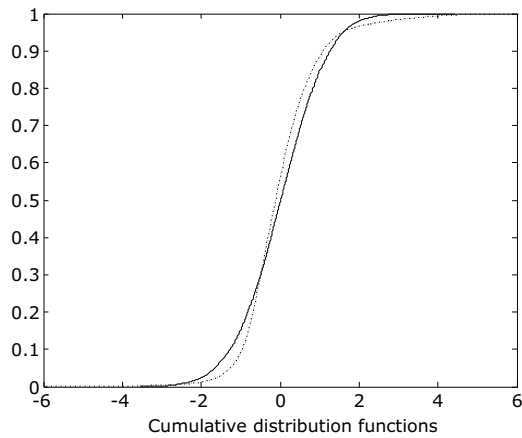


Fig. A1. Appendix figure.

Table A1. Appendix table.

Algorithm	Performance [%]	Calc. time [s]
gradient	95	100
stochastic	97	80
evolutionary	99	500

Theorem A1.

Lemma A1.

Lemma A2.

Lemma A3.

Appendix B

This is another appendix,

$$c = z + l. \quad (B1)$$

Lemma B1. (Equivalence) *Let us begin by ...* xx xx xxx
 xxx xxx xxx xxxxx xx xx xxxxx xx xx xxx xx xxx xxx xxx xx xx
 xxx xxx xxx xxx xxxxx xx xx xxxxx xx xx xxx.

Received:

Accepted: