IGHER STRUCTURES

Instructions for the use of the higherStructures class

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Abstract

This document provides the instructions for the use of higherStructures.cls, the Higher Structures class file. The T_EX file which generates this document, hsClassInst.tex, demonstrates by example how this class file is to be used. For the final version of accepted articles to this journal, the use of this class file is mandatory. To generate the title and banner, use the \maketitle command after \begin{document} and before the abstract.

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1. Class file inclusion and packages

The first line of code of the TEX file should be one of the following:

```
\documentclass{higherStructures}
```

\documentclass[twoLevelNum]{higherStructures}

The latter form invokes the option twoLevelNum. This enables theorem numbering subordinate to subsections instead of sections, and ensures that the contents navigation sidebar (in any PDF viewer) is of the corresponding depth.

Various packages are already preloaded with the class file higherStructures.cls. In order that a consistency of style is maintained, and to avoid option clashes, authors should not reload the packages geometry and hyperref. The package enumerate should not be used. It conflicts with the preloaded package enumitem, which itself provides enumerate's label-changing functions (and a lot more, see [1]).

For the full functioning of this class file, please ensure you are using the most recent T_{EX} version.

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2. Article data

The following data is mandatory:

- \title: article title, works as with other document classes, and accepts an optional argument usually intended for a shortened form of the title to be displayed on alternating headers.
- \amsclass: 2020 AMS classes associated with the article.
- \keywords: keywords associated with the article.

The data \editor, \received, \accepted, \volume, \issue, \pubYear, and \startPage are optional, and will be reset by the Managing Editor during the final processing stage.

3. Author data

An author is declared with the \author command, which accepts an optional argument for a shortened form of the author's name for use in headers and footers. Beneath any \author command the address/affiliation and email address for that author are entered by the \address and \email commands respectively. At least one author, address and email address is mandatory. It is preferred that addresses and email addresses are entered for all authors, but this is not mandatory (for instance, one could just specify the email address of the corresponding author).

4. Long titles, author names and affiliations

Authors are invited to manually insert line breaks into titles, author names or addresses, where necessary. One case where this is useful is for avoiding unfortunate line breaks in the middle of an author's name. For article titles and author names, you **must** then enter a shortened name without any line breaks, to prevent the line breaking from appearing in any headers and footers.

For example, if in addition to myself, Godfrey Harold Hardy and Srinivasa Iyengar Ramanujan are listed as authors of these notes, then you can force the third author's entire name to be on the second line by inserting a line break at the beginning of the third name as follows:

```
\author[Weber]{Mark Weber}
...
\author[Hardy]{Godfrey Harold Hardy}
\author[Ramanujan]{\\ Srinivasa Iyengar Ramanujan}
```

5. Abstract

All articles must come with an abstract provided within the

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

environment. This must be placed after the \maketitle command, and before the beginning of the first section of the article.

6. Papers in French

For papers written in French please use the **french** class file option, as in

```
\documentclass[french]{higherStructures}
\documentclass[french,twoLevelNum]{higherStructures}
```

Do **not** load the **babel** package yourself – this happens as a result of using the **french** option. With this option, it is assumed that the keywords and abstract are in French.

In addition, authors of French language papers must supply the additional data

- \engTitle: the English version of the article title.
- \engKeywords: English keywords for the article.

as well as an English abstract provided within the

\begin{engAbstract} ... \end{engAbstract}

environment which must come immediately after the abstract environment.

At this moment only English and French papers are supported by the Higher Structures class. However, it would be a simple matter to extend this functionality to any other language supported by the **babel** package. Please contact the Managing Editor if you require this additional functionality.

7. Theorems, definitions, propositions and so on

We use the amsthm package to govern the typesetting of the various theorem environments.

Remark 7.1. This should be familiar to most authors.

The complete documentation of the **amsthm** package is given in [5].

Proposition 7.2. Only the theorem environment has been predefined, so that numbering works correctly, and the other environments are left to the author to define.

Proof. See the T_EX file for these notes, and Section 5 of the class file higherStructures.cls. \Box

There are three types of environments: plain, definition and remark. Remark 7.1, Proposition 7.2, and the claim below are instances of environments defined with the declarations

```
\newtheorem{prop}[theorem]{Proposition}
\theoremstyle{definition}
\newtheorem{rem}[theorem]{Remark}
\theoremstyle{remark}
\newtheorem*{claim}{Claim}
```

in which the option [theorem] of the first two declarations, ensures that the new numbered theorem environments use the theorem counter.

Claim. Unnumbered theorem environments are defined using \newtheorem*. These can be of any type.

8. Bibliography and the contents pane

This journal uses the plain bibliography style. The bibliography below was generated by

```
\bibliographystyle{plain}
```

\bibliography{ForHSClass.bib}

where ForHSClass.bib is the $BiBT_EX$ file used for these notes. When submitting the final version of your article, please include the bibliography database file you used to generate your bibliography (for example, the .bib file if you are using $BiBT_EX$).

Commands \arxiv and \Arxiv have been added to get clickable arXiv numbers in the bibliographies. For the example [4] this was achieved with \Arxiv{1612.04888}. We will not include a table of contents in the articles themselves. However, a table of contents is generated which will display in the navigation/bookmarks bar of any PDF viewer. Numbered sections automatically appear. To add an extra bookmark, say for any unnumbered section, or indeed at any location in your article use the command

\addcontentsline{toc}{section or subsection}{<NameToAppear>}

at the location of the desired bookmark. For these notes, we have done this to ensure that the acknowledgements and bibliography show up in the bookmarks.

9. Understanding the class file

For those wishing to understand how the class file works¹, higherStructures.cls includes fairly extensive comments. Attempts have also been made to organise it in a comprehensible way. Most of the code is at a fairly high level, just using the many packages that exist for various purposes (like customising section headings). Lower level IAT_EX code was used to controls how author and article data is processed. See [2, 3] for background TEXnical information.

Appendix A: Journal style for appendices

Appendices are sections which appear within the

```
\begin{appendices} ... \end{appendices}
```

environment, and should be placed at the end of the paper just before the acknowledgements.

Acknowledgements

Please write your acknowledgements in a separate unnumbered section like this, just before the bibliography.

References

- [1] Javier Bezos. Customizing lists with the enumitem package. Available from here.
- [2] M. Goossens, F. Mittelbach, and A. Samarin. The LATEX Companion. Addison-Wesley, 1994.
- [3] Donald E. Knuth. The T_EXbook. Addison-Wesley, 1984.
- [4] S.G. Kranz. A primer of mathematical writing, second edition. ArXiv:1612.04888.
- [5] PTGAMS. Using the amsthm package. Available from here.

¹This is absolutely not necessary for those just wishing to use it.