The AES Convention Paper LaTeX class

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1 Introduction

This document describes the AES Convention Paper LaTeX style. These instructions assume you have some familiarity with using the LaTeX typesetting system. If you have never used LaTeX before, a good starting point is the book *Math into LaTeX* by B. Grätzer or the *LaTeX User's Guide* by Leslie Lamport. To learn more about books and other printed materials that cover TeX and LaTeX, go to the site `http://www.macrotex.net/texbooks/`. For more information on TeX and LaTeX, visit the TeX User's Group at `www.tug.org`.

You (the author) need to have a working and relatively recent version of TeX installed on your computer system. LaTeX is currently available on most operating systems including Windows, Macintosh, and Unix. The base LaTeX macros installed should be dated no earlier than 1998.[2]

If you do not have a TeX/LaTeX system, you can either buy one or download one for free from the internet. For a listing of both commercial and free versions visit the site `www.tug.org/interest.html`. I have found that for the Windows system the free MiKTeX system (`www.miktex.org`) works reliably; see also Section 11.2 for a listing of links to various TeX systems.

2 Getting started

Here is how your file should look:

```
\documentclass{aes130}
\authors{John Doe\aff{1} and Jane Roe\aff{2}} % MANDATORY
\affiliation[1]{BigCity College, City, ST, 00000, Country} % MANDATORY
\affiliation[2]{State Tech, Smallville, XR, Country} % MANDATORY
\lastnames{Doe, Roe} % MANDATORY
\title{Paper Title}  % MANDATORY
\shorttitle{Abbreviated Paper Title} % OPTIONAL
\correspondence{Jane Quincy-Author}{jane\_author@snailmail.qzl} % MANDATORY

\begin{abstract}
An informative and self-contained abstract of about 120 words must be
provided. An informative and self-contained abstract of about 120 words
must be provided. An informative and self-contained abstract of about
120 words must be provided. An informative and self-contained abstract
of about 120 words must be provided. An informative and self-contained
abstract of about 120 words must be provided.
```

[1] This manual describes version 0.63 of the AES Convention Paper class.

[2] You can determine the age of your LaTeX is by running LaTeX on any document and looking at the top of the `.log` file that it creates. You will see a date such as `LaTeX2e <1998/06/01>`.

```
\end{abstract}

\begin{document}

\maketitle % MANDATORY!

\section{Introduction}
And so on ... until the end.

\end{document}
```

Please note that the `\maketitle` command is mandatory and should be put immediately following the `\begin{document}` command.

Also note that the AES Convention Paper class is not a style but a class (which is why you see `aes130` as an argument to `\documentclass`).

3 Class options and fonts

By default, the AES Convention Paper class uses the standard Computer Modern fonts that come with every TEX installation. However, the AES prefers, if possible, that you prepare your files using the Times Roman font family. If your site has the proper fonts installed, the AES Convention Paper class can set your document in Times Roman.

If you use either of the font options described below and your site does not have the proper fonts already installed you will get many errors and your output will look terrible.

The Times Roman fonts are *commercial* fonts and as such the AES cannot supply them to you. You or your system administrator must buy and install them if you want to use them.

3.1 The `mathptmx` option

If your TEX installation includes the Times Roman and Helvetica fonts you can use the `mathptmx` option to use these fonts in both text and mathematics by adding the mathptmx option to the `\documentclass` command:

```
\documentclass[mathptmx]{aes130}
```

3.2 The `mathtime` option

An even better (but more expensive) option is to use the `mathtime` option which loads the MathTime fonts. These are specially crafted math fonts that are more visually compatible with Times Roman than the fonts in the `mathptm` package. However, the MathTime fonts are commercial fonts and so cannot be provided by the AES. (These fonts used to be available from the typesetting company Y&Y, but that company is now out of business; they can still be purchased from PCTEX [`http://www.pctex.com/`].) Here is how to load the MathTime fonts:

```
\documentclass[mathtime]{aes130}
```

3.3 The `caption` option

Loads the caption package; see Section 7.1 for more details.

4 Author information

Please be aware that the author information (`\author`, `\affiliation`, `\correspondence`, etc.) must be placed *before* the `\begin{document}` command.

4.1 The `\author` command

List the names of the authors inside the `\author` command. Indicate the affiliations by using the `\aff` command which takes a number as argument. Note that you can use more than one number as an affiliation (e.g., to indicate an affiliation to more than one institution you might use `\aff{1,2}`).

4.2 The `\lastnames` command

The `\lastnames` is necessary to set the names in the running heads correctly. Be sure to include only the last names separated by commas exactly as shown here:

`\lastnames{Smith}` (one author)
`\lastnames{Jones, Smith}` (two authors)
`\lastnames{Anderson, Jones, Smith}` (three or more, use only the first three)

Depending upon how many names appear in the argument of `\lastnames` the running head will appear differently. In the case of `\lastnames{Smith}` the name "SMITH" will appear in the running head. In the case of `\lastnames{Jones, Smith}` the names "JONES AND SMITH" will appear. Finally, for the case `\lastnames{Anderson, Jones, Smith}` the names "ANDERSON ET AL." will appear.

4.3 The `\correspondence` command

The `\correspondence` command takes two arguments: the name of the author who is to receive correspondence regarding the article and that author's e-mail address.

4.4 The `\shorttitle` command

This is a shortened version of the paper's title to go into the paper's running head; if this command is not used, the full title will go into the running head.

4.5 The `\preprintnumber` command

You may be given a preprint number by the AES. If so, add the `\preprintnumber` command in the preamble (put it after the `\title` command).

```
...
\title{Paper Title}  % MANDATORY
\preprintnumber{12345} % OPTIONAL
...
```

5 Mathematics

If you want a displayed math equation to be set larger than normal, you can use the `\begin{large}..\end{large}` environment. Here is an example:

```
Here is an equation set normally:
\[
x^2+y^2=z^2
\]
and here it is set larger
\begin{large}
\[
x^2+y^2=z^2
\]
\end{large}
```

This results in

Here is an equation set normally:

$$x^2 + y^2 = z^2$$

and here it is set larger

$$x^2 + y^2 = z^2$$

The sizes you can use are:

normal size		$x^2 + y^2 = z^2$
large	`\begin{large}$x^2+y^2=z^2$\end{large}`	$x^2 + y^2 = z^2$
Large	`\begin{Large}$x^2+y^2=z^2$\end{Large}`	$x^2 + y^2 = z^2$
LARGE	`\begin{LARGE}$x^2+y^2=z^2$\end{LARGE}`	$x^2 + y^2 = z^2$
huge	`\begin{huge}$x^2+y^2=z^2$\end{huge}`	$x^2 + y^2 = z^2$

6 Section and subsection numbering

By default, the AES Convention Paper class numbers sections, subsections, and subsubsection. This is a change from early versions of the AES Convention Paper class.

If you want to number some sections and not number others, you can use standard LaTeX construction `\section*`; for more information on sectioning, see page 174 of the *LaTeX User's Guide* by Leslie Lamport.

7 Figures and Tables

Because the AES Convention Paper class uses double-columns, the `figure` environment places single-column floats while the `figure*` environment causes the figures to span both columns. Similarly, `table` and `table*` generate single- and double-column floats respectively.

Here is an example where the EPS figure file `fig1.eps` is placed spanning both columns:

```
\begin{figure*}
\begin{center}
\includegraphics{fig1.eps}
\caption{This figure illustrates equation 3.4.}
\end{center}
\end{figure*}
```

Note. When LaTeX is building the current page and it encounters a double-column float, it will place that float on the *next* page. Thus, if you want a figure to appear on a given page, you may have to place the code earlier in the file. Thus, it is not possible to have a double-column float on the very first page of your paper.

Note. [Warning: The feature described in this paragraph is deprecated and will be **removed** in a future version of `aes.cls`.] When using both single- and double-column floats, it is possible for the figure numbers to appear out-of-order. To resolve this, you can give an optional argument to the `\caption` command indicating which number the figure should have. For example, `\caption[3]{This is a figure.}` will result in a caption of the form "Figure 3. This is a figure.".

However, this trick does NOT work when using the `caption` option (see section 7.1 below).

7.1 The caption option

Version 0.63 of the `aes.cls` added the `caption` option to allow better compatibility with other captioning packages such as subfig and float. If you are experiencing difficulties using other captioning or figure packages, use this option.

Here is an example where we load the `aes.cls` with the `caption` option.

```
\documentclass[caption]{aes130}
...
\begin{end}
```

Using this option causes Axel Sommerfeldt's widely-used caption package to be loaded. Be aware, however, that this disables the feature described in Section 7 to hard-code caption numbers in those cases where figure numbers get out of sequence.[3]

Note. The loading of the caption package will be the default in a future version of `aes.cls`.

8 Bibliography

For references use the `\thebibliography` environment (see pages 71–72 of the *LaTeX User's Guide*). BiBTeX is also supported.

[3] This is not such a bad thing; it is better practice to re-order the figures in the TeX code to get the numbering correct than to hard-code figure numbers.

9 Installation

The AES Convention Paper class uses the following support files:

- `aes130.cls` The Convention class file.
- `aes.cls` The base AES meeting class file (called by the class `aes130`).
- `aeslogo.eps` The AES logo in EPS (encapsulated PostScript) format.
- `aeslogo.pdf` The AES logo in PDF format (for those using PDFLaTeX).
- `manual130.dvi` This manual in DVI format.
- `manual130.pdf` This manual in PDF format.
- `paper130.tex` An example paper.
- `caption` Axel Somerfeldt's caption package. Currently this file is only necessary when using the `caption` option, but will become mandatory in a future version of `aes.cls`.
- `graphicx.sty*` Graphics macros.
- `ulem.sty` Underlining macros.

(Those files marked with an asterisk come with the standard LaTeX distribution.)

10 Common Problems

Here we address frequently encountered difficulties and incompatibilities specific to the AES Convention Paper class.

10.1 My PDF files look terrible

See Section 11 below.

10.2 The last page has unbalanced columns

The LaTeX twocolumn mode, which the AES Convention Paper class uses, does not automatically balance the columns on the last page.[4] The last page can be balanced manually by using the `\newpage` command, but it is best not to worry about this until you are ready to submit the paper.

10.3 My sections are not being numbered

See Section 6 on page 4 of this manual.

[4] There is a package called multicols that does do last page column balancing automatically, but it does not allow the use of in-column floats.

10.4 The hyperref package

[CHANGE: This section is no longer necesary due to the change in the way the `\maketitle` command is used. For backwards compatiblity the hyperref option is still accepted but is ignored.]

11 Creating good PostScript/PDF files

A fairly common problem, especially on older Unix and freeware Windows TEX systems, is that after creating a PostScript or PDF version of a TEX document, the resulting file has fonts that look "blocky" and obviously "bitmapped".

Why does this happen? In the early days of TEX, in order to print out a TeX file the printing application created bitmapped fonts from TEX Metafont files. Eventually, PostScript Type 1 fonts became available for TEX replacing the Metafont format, but many installations, especially in academic departments, still use the bitmapped fonts which, when the TEX file converts to PostScript or PDF, embed in the file as a bitmapped Type 3 font. Once this happens, there is really no way to fix the PostScript or PDF file except to re-save the files using Type 1 fonts.

What can you do about this? The TeX installation administrator, whether it is you, the author, or the system administrator, needs to get the freely available PostScript Type 1 fonts, install them, and set up the PostScript/PDF output application to use the Type 1 fonts instead of the bitmapped fonts. How to install the fonts and configure the applications to use them varies depending on the TEX system (MikTEX on Windows is different from teTeX on Unix which is different than OzTEX on the Macintosh, etc.). Usually a commercial TEX implementation will have instructions at their web site on how to do all this. For non-commercial TEX systems, the news group `comp.text.tex` often has useful information.

Also, when creating a pdf be sure to embed all fonts in the PDF file.

You can also try creating a `.pdf` file directly by using the pdfLATEX program. This will often solve the font embedding problem. To see if you have this program on your system, try typing `pdflatex` at a command prompt.

11.1 Downloading the Type 1 fonts

The fonts can be downloaded at `http://www.ams.org/publications/authors/tex/amsfonts` where there is some limited installation information.

11.2 Some online resources for selected TEX systems

The following are some links to online information for a few commercial TEX systems.[5]

```
MikTeX   http://www.miktex.org/ (Windows)
MacTeX   http://www.tug.org/mactex/2010/ (Max OS X)
PC TeX   http://www.pctex.com/help.html (Windows)
TeXShop  http://pages.uoregon.edu/koch/texshop/texshop.html (Mac OS X)
VTeX     http://www.micropress-inc.com/ (Windows)
OzTeX    http://www.trevorrow.com/oztex/ozfaq.html (Mac OS X) (moribund?)
Y&Y TeX  (company out of business, but see http://www.tug.org/yandy/)
         (Y&Y TeX uses Type 1 fonts natively) (Windows)
```

[5] Please note that this list was last checked in February 2011.

12 Changes

12.1 Version 0.14 (7 May 2000)

Add PDFLaTeX support (thanks to Frank Siebenhaar).

12.2 Version 0.20 (27 May 2001)

Changed from multicols to twocolumn to reduce figure and table float problems. Changed sectioning commands to allow for section and subsection numbering.

12.3 Version 0.30 (17 August 2001)

Changed how author information is coded.

12.4 Version 0.33 (30 November 2002)

Added `\preprintnumber` command.

12.5 Version 0.36 (8 June 2003)

Changed sectioning to put in section numbers by default.

12.6 Version 0.37 (8 June 2003)

Changed sectioning to put in section numbers by default.

12.7 Version 0.38 (11 June 2004)

Added the font options `mathptmx` and `mathtime`.

12.8 Version 0.40 (17 February 2005)

Fixed problem where lack of blank line preceding sectioning command caused misformatting.

12.9 Version 0.41 (2 April 2006)

Redefined captioning to set header in boldface (e.g., **Fig. 12** rather than Fig. 12).

12.10 Version 0.50 (10 February 2007)

Fix to `aes.cls` to take into account change in way latex is run with MiKTeX 2.5.

12.11 Version 0.60 (26 February 2007)

Large change where we now require the explicit use of the `\maketitle` command. This change was necessary to avoid the chronic problem of `\AtBeginDocument` clashes with other packages (such as hyperref and pstricks).

12.12 Version 0.61 (28 March 2008)

Fix to `aes.cls` to repair bug due to last page numbering error when the last page consists only of floats (reported by Luis I. Ortiz Berenguer).

12.13 Version 0.63 (13 March 2010)

Added the `caption` option to offer better compatibility with other captioning and figure packages (such as subfig and float). (Compatibility issues reported by Johan Pauwels.) I am deprecating the hard-coding of figure numbers (will remove feature altogether in a future version).