The elbioimp class

Dag Langmyhr[1]

1. *Department of Informatics, University of Oslo, dag@ifi.uio.no*

Abstract

This paper describes the implementation of the document class elbioimp which has been designed for writing articles in the *Journal of Electrical Bioimpedance*. It corresponds to elbioimp v1.2, dated 2011/03/02.

Keywords: LaTeX document class, journal document style

Introduction

The *Journal of Electrical Bioimpedance* (see its web page at https://www.journals.uio.no/index.php/bioimpedance) has defined a typographic style for its publication, to some extent based on recommendations from the *US National institute of health*[1]. The LaTeX document class elbioimp implements this style. As an example, this documentation uses the elbioimp class.

Usage

To use this document class, you must first put the elbioimp.cls file somewhere that LaTeX can find it.[1] Then you can write your LaTeX document starting with

```
\documentclass{elbioimp}
```

The document class is based on the standard *article* class and is used just like that class, with three exceptions:

1. The authors' affiliations (to companies or academic institutions) are given with the `\affiliation` command:

   ```
   \author{My name\affiliation{My univerisity,
       My city, My country}}
   ```

   If there is more than one author, their names should be separated by an `\and` command.

   If two authors have the same affiliation, the latter one may use the `\sameaffiliation` command, as in

   ```
   \author{First Author\affiliation{My university,
     My city, My country}\and
     Second Author\sameaffiliation}
   ```

   In case there should be three or more authors and some have identical affiliations, `\sameaffiliation` may be given a numeric option referencing a previous author; for example, if the first and the third author belong to the same institution, you may write:

   ```
   \author{A Bee\affiliation{Uni A}\and
       C Dee\affiliation{Uni B}\and
       E Eff\sameaffiliation[1]}
   ```

2. The author may indicate keywords by empoying the `\keyword` command.

3. The document class will function poorly unless there is an `abstract` environment and a `\maketitle` command.

Class headers

All LaTeX 2_ε class files contain a header with a set of standard specifications.

Class options

This document class has no options.

```
\DeclareOption*{\ClassWarningNoLine
  {elbioimp}{Class option \CurrentOption
    \space is illegal in this document class}}
\ProcessOptions \relax
```

Base class

This document class is based on the standard *article* class.

```
\LoadClass[twocolumn]{article}
```

Required packages

A couple of standard packages are necessary to implement this class.

The ifthen package

The ifthen package makes testing easier.

```
\RequirePackage{ifthen}
```

The url package

URLs should be typeset in a Sans serif font rather than a `Teletype font`.

```
\RequirePackage[T1]{url}
\urlstyle{sf}
```

[1] If you are not very familiar with your LaTeX installation or your system administrator, you can put the elbioimp.cls file in the same folder as your LaTeX source files.

Document title area

The title area has its own particular design. It is implemented by redefining the `\maketitle` command.

```
\AtBeginDocument{\renewcommand{\maketitle}{%
  \twocolumn[\begin{minipage}{\textwidth}
    \renewcommand{\and}{, }
    \let \thanks = \affiliation
    \let \samethanks = \sameaffiliation
    \renewcommand{\footnoterule}{}
    \def \@makefntext ##1{\noindent
      \small \@thefnmark. \it ##1}
    \renewcommand{\thempfootnote}%
      {\arabic{mpfootnote}}
    \parindent = 0pt
    {\huge \@title}\par\vspace{16pt}
    {\large \@author}
  \end{minipage}\par\vspace{14pt}\noindent
  \elb@rule{\textwidth}\vspace{11pt}]}}
\newcommand{\elb@rule}[1]{\rule{#1}{0.6pt}}
```

(The names `\thanks` and `\samethanks` are kept for historic reasons.)

Affiliations

Affiliations are specified using the `\affiliation` and `\sameaffiliation` commands.

```
\newcommand{\affiliation}[1]{\footnote{#1}}
\newcommand{\sameaffiliation}[1][0]{%
  \addtocounter{mpfootnote}{-1}%
  \ifthenelse{#1<1}
    {\@makefnmark}
    {\@textsuperscript{\normalfont#1}}%
  \addtocounter{mpfootnote}{1}}
```

Keywords

An additional command `\keywords` makes it possible to specify keywords that apply to the document.

```
\newcommand{\keywords}[1]{\def\elb@keywords{#1}}
```

Abstract

The abstract is typeset in `\small`, and includes the keywords (if any).

```
\renewenvironment{abstract}
  {\small\noindent
    \textbf{\abstractname}\par\vspace{1pt}
    \noindent\ignorespaces}
  {\par
   \@ifundefined{elb@keywords}{}{%
     \vspace{\baselineskip}\noindent
     \textbf{Keywords:} \elb@keywords\par}
   \vspace{\baselineskip}\noindent
   \elb@rule{\columnwidth}}
```

`\Huge`	20 pt
`\huge`	16 pt
`\LARGE`	14 pt
`\Large`	12 pt
`\large`	11 pt
`\normalsize`	10 pt
`\small`	9 pt
`\footnotesize`	8 pt
`\scriptsize`	7 pt
`\tiny`	5 pt

Tab. 1: Text sizes in elbioimp

Body text

Text area

The text area should be in two columns and fill an A4 paper with margins 1.5 cm (except the top margin, which should be 2.5 cm). The gutter space should be 1 cm.

```
\RequirePackage[a4paper,
  margin=1.5cm,top=2.5cm]{geometry}
\setlength{\columnsep}{1cm}
```

Since the layout uses double columns, I will increase the tolerance for line-breaking.

```
\pretolerance = 1000
\tolerance = 2000   \hbadness = \tolerance
```

Headers and footers

This document class has neither headers nor footers, presumably because the publisher will add them later.

```
\AtBeginDocument{\pagestyle{empty}}
```

Text font

The specified journal font is *Times Roman*. The *mathptmx* packages is one of several packages that can handle this, but this particular package has the advantage that it also uses *Times Roman* for the math fonts (as much as possible).

```
\RequirePackage{mathptmx}
```

The *mathptmx* package retains the Computer Modern Sans Serif and `Computer Modern Teletype` fonts, but they blend reasonably well with *Times Roman* (at least in my opinion) so I will keep them.

Text sizes

The specified text sizes are shown in Table 1. The leading should be 30%.

```
\renewcommand{\Huge}{\@setfontsize
  \Huge {20}{26}}
\renewcommand{\huge}{\@setfontsize
  \huge {16}{20.8}}
\renewcommand{\LARGE}{\@setfontsize
  \LARGE {14}{18.2}}
```

```
\renewcommand{\Large}{\@setfontsize
  \Large {12}{15.6}}
\renewcommand{\large}{\@setfontsize
  \large {11}{14.3}}
\renewcommand{\normalsize}{%
   \@setfontsize \normalsize {10}{13}%
   \abovedisplayskip =
     10pt plus 2pt minus 5pt
   \abovedisplayshortskip =
     0pt plus 3pt
   \belowdisplayshortskip =
     6pt plus 3pt minus 3pt
   \belowdisplayskip = \abovedisplayskip
   \def\@listi{\leftmargin = \leftmargini
     \topsep = 5pt plus 2pt minus 2pt
     \parsep = 3pt plus 1pt minus 1pt
     \itemsep = \topsep}}
\renewcommand{\small}{%
   \@setfontsize \small {9}{11.7}%
   \abovedisplayskip =
     8.5pt plus 3pt minus 4pt
   \abovedisplayshortskip =
     0pt plus 2pt
   \belowdisplayshortskip =
     4pt plus 2pt minus 2pt
   \def\@listi{\leftmargin = \leftmargini
     \topsep = 4pt plus 2pt minus 2pt
     \parsep = 2pt plus 1pt minus 1pt
     \itemsep = \topsep}%
   \belowdisplayskip = \abovedisplayskip}
\renewcommand{\footnotesize}{%
   \@setfontsize \footnotesize {8}{10.4}%
   \abovedisplayskip =
     6pt plus 2pt minus 4pt
   \abovedisplayshortskip =
     0pt plus 1pt
   \belowdisplayshortskip =
     3pt plus 1pt minus 2pt
   \def\@listi{\leftmargin = \leftmargini
     \topsep = 3pt plus 1pt minus 1pt
     \parsep = 1.5pt plus 1pt minus 1pt
     \itemsep = \topsep}%
   \belowdisplayskip = \abovedisplayskip}
\renewcommand{\scriptsize}{\@setfontsize
  \scriptsize {7}{9.1}}
\renewcommand{\tiny}{\@setfontsize
  \tiny {5}{6.5}}
```

As expected, `\normalsize` is the default.

```
\normalsize
```

Since the class uses some non-standard sizes (i.e., not in the 1.2^n-series) it must signal LaTeX that font scaling may be used.[2]

```
\RequirePackage{type1cm,type1ec}
```

The class must also define some math sizes.

```
\DeclareMathSizes{11}{11}{8}{6}
\DeclareMathSizes{14}{14}{11}{8}
\DeclareMathSizes{16}{16}{12}{10}
\DeclareMathSizes{20}{20}{14}{12}
```

[2] These days, all decent LaTeX installations should provide scalable fonts.

Sectioning

The section headers in this class have a different look from the standard LaTeX classes.

```
\renewcommand{\section}{\@startsection
  {section}{1}{0pt}%
  {-11pt plus -6pt minus -2pt}%
  {11pt plus 6pt minus 2pt}%
  {\normalfont\normalsize\bf}}
\renewcommand{\subsection}{\@startsection
  {subsection}{2}{0pt}%
  {-11pt plus -6pt minus -2pt}%
  {11pt plus 6pt minus 2pt}%
  {\normalfont\normalsize\it}}
\renewcommand{\subsubsection}{\@startsection
  {subsubsection}{3}{0pt}%
  {-11pt plus -6pt minus -2pt}%
  {11pt plus 6pt minus 2pt}%
  {\normalfont\normalsize}}
```

The default definitions of `\paragraph` and `\subparagraph` are retained.

Section numbering

No sections should be numbered.

```
\setcounter{secnumdepth}{-2}
```

Floats

Formating of float captions is best handled using the caption package. This style wants them

- indentend 0.5 cm on each side
- 8 pt type size
- numbering should use “Fig. 1” or “Tab. 1”.

```
\RequirePackage[margin=0.5cm,font=footnotesize,
  aboveskip=5pt]{caption}
\DeclareCaptionLabelFormat{fig}
  {\ifthenelse{\equal{#1}%
    {Figure}}{Fig}{Tab}.~#2}
\captionsetup{labelformat=fig}
```

We also adjust the spacing around the floats, and we do not want half-empty float-columns.

```
\setlength{\floatsep}{6pt plus 3pt}
\setlength{\textfloatsep}{\floatsep}
\renewcommand{\floatpagefraction}{0.8}
```

Document reference list

The reference list should be according to the Vancouver style:

```
\bibliographystyle{vancouver}
```

but the bibliography should be set in 9 pt type size with 3 pt vertical space.

```
\renewcommand{\@openbib@code}{\small
  \setlength{\itemsep}{3pt}%
  \setlength{\parsep}{1pt plus 1pt}}
```

In the bibliography, citations will be indicated as “1.” rather than as “[1]”.

```
\renewcommand\@biblabel[1]{#1.}
```

References

1. National institue of health. International committee of medical journal editors uniforum requirements for manuscripts submitted to biomedical journals;. Available from http://www.nlm.nih.gov/bsd/uniform_requirements.html. Updated 2009 Aug 28; cited 2009 Oct 6.

Change History

Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.