The elbioimp class[1]

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1. *This document corresponds to elbioimp v1.0, dated 2010/02/08.*
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Abstract

This paper describes the implementation of the document class elbioimp which is intended for writing articles in the *Journal of Electrical Bioimpedance*.

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.

This LaTeX code is published with a **LaTeX project public license** as described in http://www.latex-project.org/lppl/.

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 are given with the \thanks command, as in

   ```
   \author{My name\thanks{My univerisity,
       My country}}
   ```

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

3. The document class will function poorly unless there is an abstract environment.

Class headers

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

Class options

The document class has no options.

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

Base class

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

```
5 \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.

```
6 \RequirePackage{ifthen}
```

The url package

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

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

Document title area

The title area has its own particular design.

```
9  \AtBeginDocument{\renewcommand{\maketitle}{%
10   \twocolumn[\begin{minipage}{\textwidth}
11     \renewcommand{\and}{, }
12     \let \thanks = \footnote
13     \renewcommand{\footnoterule}{}
14     \def \@makefntext ##1{\noindent
15       \small \@thefnmark. \it ##1}
16     \renewcommand{\thempfootnote}%
17       {\arabic{mpfootnote}}
18     \parindent = 0pt
19     {\huge \@title}\par\vspace{16pt}
20     {\large \@author}
21   \end{minipage}\par\vspace{14pt}\noindent
22   \elb@rule{\textwidth}\vspace{11pt}]}}
23 \newcommand{\elb@rule}[1]{\rule{#1}{0.6pt}}
```

Keywords

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

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

Abstract

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

```
25 \renewenvironment{abstract}
26   {\small\noindent
27     \textbf{\abstractname}\par\vspace{1pt}
28     \noindent\ignorespaces}
29   {\par
30   \@ifundefined{elb@keywords}{}{%
31     \vspace{\baselineskip}\noindent
32     \textbf{Keywords:} \elb@keywords\par}
33   \vspace{\baselineskip}\noindent
34   \elb@rule{\columnwidth}}
```

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[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.

\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.

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

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

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

Headers and footers

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

```
40 \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).

```
41 \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 10%.

```
42 \renewcommand{\Huge}{\@setfontsize%
43   \Huge {20}{22}}
44 \renewcommand{\huge}{\@setfontsize
45   \huge {16}{17.6}}
46 \renewcommand{\LARGE}{\@setfontsize
47   \LARGE {14}{15.4}}
48 \renewcommand{\Large}{\@setfontsize
49   \Large {12}{13.2}}
50 \renewcommand{\large}{\@setfontsize
51   \large {11}{12.1}}
52 \renewcommand{\normalsize}{%
53   \@setfontsize \normalsize {10}{11}
54   \abovedisplayskip =
55     10pt plus 2pt minus 5pt
56   \abovedisplayshortskip =
57     0pt plus 3pt
58   \belowdisplayshortskip =
59     6pt plus 3pt minus 3pt
60   \belowdisplayskip = \abovedisplayskip
61   \def\@listi{\leftmargin = \leftmargini
62     \topsep = 5pt plus 2pt minus 2pt
63     \parsep = 3pt plus 1pt minus 1pt
64     \itemsep = \topsep}}
65 \renewcommand{\small}{%
66   \@setfontsize \small {9}{9.9}%
67   \abovedisplayskip =
68     8.5pt plus 3pt minus 4pt
69   \abovedisplayshortskip =
70     0pt plus 2pt
71   \belowdisplayshortskip =
72     4pt plus 2pt minus 2pt
73   \def\@listi{\leftmargin = \leftmargini
74     \topsep = 4pt plus 2pt minus 2pt
75     \parsep = 2pt plus 1pt minus 1pt
76     \itemsep = \topsep}%
77   \belowdisplayskip = \abovedisplayskip}
78 \renewcommand{\footnotesize}{%
79   \@setfontsize \footnotesize {8}{8.8}%
80   \abovedisplayskip =
81     6pt plus 2pt minus 4pt
82   \abovedisplayshortskip =
83     0pt plus 1pt
84   \belowdisplayshortskip =
85     3pt plus 1pt minus 2pt
86   \def\@listi{\leftmargin = \leftmargini
87     \topsep = 3pt plus 1pt minus 1pt
88     \parsep = 1.5pt plus 1pt minus 1pt
89     \itemsep = \topsep}%
90   \belowdisplayskip = \abovedisplayskip}
91 \renewcommand{\scriptsize}{\@setfontsize
92   \scriptsize {7}{7.7}}
93 \renewcommand{\tiny}{\@setfontsize
94   \tiny {5}{5.5}}
```

As expected, \normalsize is the default.

```
95 \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]

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

The class must also define some math sizes.

```
97 \DeclareMathSizes{11}{11}{8}{6}
98 \DeclareMathSizes{14}{14}{11}{8}
99 \DeclareMathSizes{16}{16}{12}{10}
100 \DeclareMathSizes{20}{20}{14}{12}
```

Sectioning

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

```
101 \renewcommand{\section}{\@startsection
102   {section}{1}{0pt}%
103   {-11pt plus -6pt minus -2pt}%
104   {11pt plus 6pt minus 2pt}%
105   {\normalfont\normalsize\bf}}
106 \renewcommand{\subsection}{\@startsection
107   {subsection}{2}{0pt}%
108   {-11pt plus -6pt minus -2pt}%
109   {11pt plus 6pt minus 2pt}%
110   {\normalfont\normalsize\it}}
```

More detailed levels than \subsection are not defined for this style, so I define them to have the same appearance as \subsection.

```
111 \renewcommand{\subsubsection}{\@startsection
112   {subsubsection}{3}{0pt}%
```

---

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

```
113   {-11pt plus -6pt minus -2pt}%
114   {11pt plus 6pt minus 2pt}%
115   {\normalfont\normalsize\it}}
116 \renewcommand{\paragraph}{\@startsection
117   {paragraph}{4}{0pt}%
118   {-11pt plus -6pt minus -2pt}%
119   {11pt plus 6pt minus 2pt}%
120   {\normalfont\normalsize\it}}
121 \renewcommand{\subparagraph}{\@startsection
122   {subparagraph}{5}{0pt}%
123   {-11pt plus -6pt minus -2pt}%
124   {11pt plus 6pt minus 2pt}%
125   {\normalfont\normalsize\it}}
```

Section numbering

No sections should be numbered.

```
126 \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".

```
127 \RequirePackage[margin=0.5cm,font=footnotesize,
128   aboveskip=5pt]{caption}
129 \DeclareCaptionLabelFormat{fig}
130   {\ifthenelse{\equal{#1}%
131     {Figure}}{Fig}{Tab}.\,#2}
132 \captionsetup{labelformat=fig}
133 \setlength{\floatsep}{6pt plus 3pt}
134 \setlength{\textfloatsep}{\floatsep}
```

Document reference list

The reference list should be according to the Vancouver style:

```
135 \bibliographystyle{vancouver}
```

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

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

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

```
139 \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.

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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.