

# The elbioimp class

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## 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:** L<sup>A</sup>T<sub>E</sub>X document class, journal document style

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## 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 L<sup>A</sup>T<sub>E</sub>X document class `elbioimp` implements this style. As an example, this documentation uses the `elbioimp` class.

This L<sup>A</sup>T<sub>E</sub>X code is published with a **L<sup>A</sup>T<sub>E</sub>X project public license**, as described in <http://www.latex-project.org/lppl/>.

## Usage

To use this document class, you must first put the `elbioimp.cls` file somewhere that L<sup>A</sup>T<sub>E</sub>X can find it.<sup>1</sup> Then you can write your L<sup>A</sup>T<sub>E</sub>X 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}
```

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<sup>1</sup>If you are not very familiar with your L<sup>A</sup>T<sub>E</sub>X installation or your system administrator, you can put the `elbioimp.cls` file in the same folder as your L<sup>A</sup>T<sub>E</sub>X source files.

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

## Class headers

All L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> class files contain a header with a set of standard specifications.

### *Class options*

This 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. It is implemented by redefining the `\maketitle` command.

```
9 \AtBeginDocument{\renewcommand{\maketitle}{%
10 \twocolumn[\begin{minipage}{\textwidth}
11 \renewcommand{\and}{, }
12 \let \thanks = \affiliation
13 \let \samethanks = \sameaffiliation
14 \renewcommand{\footnoterule}{%
15 \def \@makefntext ##1{\noindent
16 \small \@theftmark. \it ##1}
17 \renewcommand{\thempfootnote}%
18 {\arabic{mpfootnote}}
19 \parindent = 0pt
20 {\huge \@title}\par\vspace{16pt}
21 {\large \@author}
22 \end{minipage}\par\vspace{14pt}\noindent
23 \elb@rule{\textwidth}\vspace{11pt}}}%
24 \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.

```
25 \newcommand{\affiliation}[1]{\footnote{#1}}
26 \newcommand{\sameaffiliation}[1][0]{%
27 \addtocounter{mpfootnote}{-1}%
28 \ifthenelse{#1<1}
29 {\@makefntmark}
30 {\@textsuperscript{\normalfont#1}}%
31 \addtocounter{mpfootnote}{1}}
```

## Keywords

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

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

## Abstract

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

```
33 \renewenvironment{abstract}
34 {\small\noindent
35 \textbf{\abstractname}\par\vspace{1pt}
36 \noindent\ignorespaces}
37 {\par
38 \@ifundefined{elb@keywords}{}%
39 \vspace{\baselineskip}\noindent
40 \textbf{Keywords:} \elb@keywords\par}
41 \vspace{\baselineskip}\noindent
42 \elb@rule{\columnwidth}}
```

<code>\Huge</code>	20 pt
<code>\huge</code>	16 pt
<code>\LARGE</code>	14 pt
<code>\Large</code>	12 pt
<code>\large</code>	11 pt
<code>\normalsize</code>	10 pt
<code>\small</code>	9 pt
<code>\footnotesize</code>	8 pt
<code>\scriptsize</code>	7 pt
<code>\tiny</code>	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.

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

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

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

### Headers and footers

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

```
48 \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).

```
49 \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%.

```
50 \renewcommand{\Huge}{\@setfontsize
51 \Huge {20}{26}}
52 \renewcommand{\huge}{\@setfontsize
53 \huge {16}{20.8}}
54 \renewcommand{\LARGE}{\@setfontsize
55 \LARGE {14}{18.2}}
```

```

56 \renewcommand{\Large}{\@setfontsize
57 \Large {12}{15.6}}
58 \renewcommand{\large}{\@setfontsize
59 \large {11}{14.3}}
60 \renewcommand{\normalsize}{%
61 \@setfontsize \normalsize {10}{13}%
62 \abovedisplayskip =
63 10pt plus 2pt minus 5pt
64 \abovedisplayshortskip =
65 0pt plus 3pt
66 \belowdisplayshortskip =
67 6pt plus 3pt minus 3pt
68 \belowdisplayskip = \abovedisplayskip
69 \def\@listi{\leftmargin = \leftmargini
70 \topsep = 5pt plus 2pt minus 2pt
71 \parsep = 3pt plus 1pt minus 1pt
72 \itemsep = \topsep}}
73 \renewcommand{\small}{%
74 \@setfontsize \small {9}{11.7}%
75 \abovedisplayskip =
76 8.5pt plus 3pt minus 4pt
77 \abovedisplayshortskip =
78 0pt plus 2pt
79 \belowdisplayshortskip =
80 4pt plus 2pt minus 2pt
81 \def\@listi{\leftmargin = \leftmargini
82 \topsep = 4pt plus 2pt minus 2pt
83 \parsep = 2pt plus 1pt minus 1pt
84 \itemsep = \topsep}%
85 \belowdisplayskip = \abovedisplayskip}
86 \renewcommand{\footnotesize}{%
87 \@setfontsize \footnotesize {8}{10.4}%
88 \abovedisplayskip =
89 6pt plus 2pt minus 4pt
90 \abovedisplayshortskip =
91 0pt plus 1pt
92 \belowdisplayshortskip =
93 3pt plus 1pt minus 2pt
94 \def\@listi{\leftmargin = \leftmargini
95 \topsep = 3pt plus 1pt minus 1pt
96 \parsep = 1.5pt plus 1pt minus 1pt
97 \itemsep = \topsep}%
98 \belowdisplayskip = \abovedisplayskip}
99 \renewcommand{\scriptsize}{\@setfontsize
100 \scriptsize {7}{9.1}}
101 \renewcommand{\tiny}{\@setfontsize
102 \tiny {5}{6.5}}

```

As expected, `\normalsize` is the default.

```
103 \normalsize
```

Since the class uses some non-standard sizes (i.e., not in the 1.2<sup>n</sup>-series) it must signal L<sup>A</sup>T<sub>E</sub>X that font scaling may be used.<sup>2</sup>

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

The class must also define some math sizes.

```

105 \DeclareMathSizes{11}{11}{8}{6}
106 \DeclareMathSizes{14}{14}{11}{8}
107 \DeclareMathSizes{16}{16}{12}{10}
108 \DeclareMathSizes{20}{20}{14}{12}

```

<sup>2</sup>These days, all decent L<sup>A</sup>T<sub>E</sub>X installations should provide scalable fonts.

## Sectioning

The section headers in this class have a different look from the standard L<sup>A</sup>T<sub>E</sub>X classes.

```

109 \renewcommand{\section}{\@startsection
110 {section}{1}{0pt}%
111 {-11pt plus -6pt minus -2pt}%
112 {11pt plus 6pt minus 2pt}%
113 {\normalfont\normalsize\bf}}
114 \renewcommand{\subsection}{\@startsection
115 {subsection}{2}{0pt}%
116 {-11pt plus -6pt minus -2pt}%
117 {11pt plus 6pt minus 2pt}%
118 {\normalfont\normalsize\it}}
119 \renewcommand{\subsubsection}{\@startsection
120 {subsubsection}{3}{0pt}%
121 {-11pt plus -6pt minus -2pt}%
122 {11pt plus 6pt minus 2pt}%
123 {\normalfont\normalsize}}

```

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

### Section numbering

No sections should be numbered.

```
124 \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”.

```

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

```

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

```

131 \setlength{\floatsep}{6pt plus 3pt}
132 \setlength{\textfloatsep}{\floatsep}
133 \renewcommand{\floatpagefraction}{0.8}

```

## Document reference list

The reference list should be according to the Vancouver style:

```
134 \bibliographystyle{vancouver}
```

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

```

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

```

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

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

## References

1. National institute of health. International committee of medical journal editors uniform requirements for manuscripts submitted to biomedical journals;. Available from [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html). Updated 2009 Aug 28; cited 2009 Oct 6.

## Change History

v1.0		v1.2
General: Initial version .....	1	
v1.1		General: Added <code>\subsection</code> , <code>\affiliation</code> , and
General: Line spacing modified .....	1	<code>\sameaffiliation</code> .....
		1

## 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.

<b>Symbols</b>	<b>F</b>	<b>N</b>
<code>\@biblabel</code> .....	<code>\floatpagefraction</code> .....	<code>\normalsize</code> 60, 61, 103, 113, 118, 123
<code>\@openbib@code</code> .....	<code>\floatsep</code> .....	
		<b>P</b>
<b>A</b>	<code>\footnotesize</code> .....	<code>\pretolerance</code> .....
<code>\abovedisplayshortskip</code> .		46
<code>\abovedisplayskip</code> .....	<b>H</b>	
..... 62, 68, 75, 85, 88, 98	<code>\hbadness</code> .....	<b>S</b>
<code>\affiliation</code> .....	<code>\Huge</code> .....	<code>\sameaffiliation</code> .....
<code>\and</code> .....	<code>\huge</code> .....	13, 26
11		<code>\samethanks</code> .....
	<b>K</b>	<code>\scriptsize</code> .....
<b>B</b>	<code>\keywords</code> .....	99, 100
<code>\belowdisplayshortskip</code> .	32	<code>\section</code> .....
<code>\belowdisplayskip</code> .....		109
66, 79, 92	<b>L</b>	<code>\small</code> .....
68, 85, 98	<code>\LARGE</code> .....	16, 34, 73, 74, 135
	<code>\Large</code> .....	<code>\subsection</code> .....
<b>C</b>	<code>\large</code> .....	114
<code>\columnsep</code> .....	21, 58, 59	<code>\subsubsection</code> .....
45		119
	<b>M</b>	
<b>E</b>	<code>\maketitle</code> .....	<b>T</b>
<code>\elb@keywords</code> .....	9	<code>\textfloatsep</code> .....
<code>\elb@rule</code> .....		132
23, 24, 42		<code>\thanks</code> .....
		12
		<code>\tiny</code> .....
		101, 102
		<code>\tolerance</code> .....
		47