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How to Use "risee-e.cls" Class File for the Research Reports on ISEE

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Abstract: ISEE (Information Science and Electrical Engineering of Kyushu University) provides a LaTeX 2ε class file, named `risee-e.cls`, for the Research Reports on ISEE. This document describes how to use the class file, and also makes some remarks about typesetting a document by using LaTeX 2ε.

Keywords: Class file, LaTeX 2ε

1. Introduction

This document describes how to handle the `risee-e.cls` for the Research Reports on ISEE. Section 2.1 explains how to typeset papers based on the template file. Section 2.2 describes a special feature of `risee-e.cls` with some remarks that should be aware of on writing a paper. Section 3 describes general notes about typesetting documents with LaTeX 2ε, including typical typographic errors and suggested corrections, and some hints on handling long formulas. Section A.1 explains how to make pdf files.

2. How to Typeset Papers

2.1 Template

The template file `template-e.tex` is distributed with the `risee-e.cls`. Below is the contents of the template.

```
\documentclass{risee-e}
\usepackage{graphicx}
\usepackage{ulem}
\begin{document}
\Year{2010}
\Vol{15}
\No{1}
\Month{3}
\title{title}
\authorlist{%
 \authorentry{name}{label}
}
\affiliate[label]{affiliate}

\received{2010}{2}{26}
%\revised{2010}{3}{1}

\begin{abstract}
 summary
\end{abstract}
\begin{keywords}
 keywords
\end{keywords}
\maketitle
\section{Introduction}
...
\acknowledgments

\lastpagebalanced{40mm}

\begin{thebibliography}{9}
\bibitem{1}
 ...
\end{thebibliography}
\end{document}
```

- The `\Year`, `\Vol`, `\No`, `\Month` commands are used for specifying the publication year, volume, number, and month, respectively. The information is used for producing the header of the first page.

  Compile your manuscript with the `platex` command in order to produce the Japanese part of the header. If you do not have an ASCII Japanese pLaTeX 2ε system, then use the standard `latex` command to compile. In this case, the Japanese part is missing, but the editors put the part when published.
- The title of the paper is specified in `\title`. You may use `\\` to start a new line in a long title. The argument of the `\title` command is used for producing a running head, as well as the title.

  If you want a shorter title for the running head, type as follows.
  `\title[`*short title*`]{`*title*`}`
- The outputs of authors' names and marks of affiliates are automatically generated by using the `\authorlist` and `\authorentry` commands. Each of the `\authorentry` commands must be described as an argument of the `\authorlist` command. The `\authorentry` command has two arguments.
  `\authorentry{`*name*`}{`*label*`}`

  For example, they could be typesetted as follows.

*Department of Informatics, Graduate Student
**Department of Advanced Information Technology, Graduate Student
***Department of Electrical Engineering

```
\authorlist{%
␣\authorentry{Author␣First}{DI}
␣\authorentry{Author␣Second}{DIS}
}
```

  - The first argument of `\authorentry` is an author's name. All letters of the family name are automatically capitalized after compiling.

    If your name has special letters with accents, for example ç (`\c{c}`), ç (`\b{c}`) and ç (`\d{c}`), type as follows.

    `\noexpand\c{c}`
  - The first argument of `\authorentry` is also used to generate the right header, where the first names are replaced by its initial letters.

    In the case of "Zi-Jiang Yang", you may typeset as follows.

    `\authorentry[Z.J.]{Zi-Jiang Yang}{DIS}`

    Then, "Z.J. Yang" is generated instead of "Z. Yang"on the right header.
  - The second argument is the label of the author's affiliate, corresponding to the label of the `\affiliate` command (see below). For example, an abbreviation for the department name such as INF and AIT is a good choice.

    No extra spaces may be added between a letter and a brace. `{DIS}` and `{DIS␣}` are regarded as different labels.

- If you want to break a line of author's lists at any point, you may use the `\breakauthorline` command.

  `\breakauthorline{`*num,num,num,...*`}`

  num must be a positive integer. If "`3`" is specified, the line-break will be occurred after the third author. If "`3,6`" is specified, line-breaks will be occurred after the third and sixth authors.
- Author's affiliate is specified in the `\affiliate` command as follows.

  `\affiliate[label]{affiliate}`

  The entry of `\affiliate` must be put in the same order as the labels of `\authorentry` lists.
  - The first argument `label` must be the same as the 2nd argument of the `\authorentry` command. No extra spaces may be added between a letter and a bracket. The second argument is filled with the author's affiliate.
  - If a label of `affiliate` is different from any label of `\authorentry`, there will come a warning message on your terminal.
- The `\received` command is required to generate the date of receipt of the manuscript. It takes three arguments, year, month and day.

  For example, the date of receipt is specified as follows.

  `\received{2010}{2}{26}`

  In the case of revision of manuscript, The `\revised` command is also required.

  ```
  \received{2010}{2}{26}
  \revised{2010}{3}{1}
  ```
- The abstract is described in the `abstract` environment. The abstract may not exceed 200 words.
- The keywords is described in the `keywords` environment.
- The `\maketitle` command must come right after `keywords` environment (before the main text).
- If you want to express your gratitude, use the `\acknowledgments` command. It generates "**Acknowledgments**" in the center of line.
- If you need appendix, use the `\appendix` command right before the appendix begins. In the appendix, sections are numbered "A.1.", "A.2.", etc., equations are numbered "(A.1)", "(A.2)", etc., and figures are numbered "Fig. A.1", "Fig. A.2", etc.
- The balancing of the left and right columns of the last page is required. To this end, you can use `\lastpagebalanced` command somewhere on the left column of the last page. You need to explicitly specify the height of the space at the bottom of the last page in the argument of the command. It produces a wave line stretching from the left to right columns, below which a blank figure of the specified height is generated.

  `\lastpagebalanced{40mm}`

  The definition is as follows.

```
\def\lastpagebalanced#1{%
 \begin{figure}[b]
  \leavevmode
  \hbox to \hsize{\hbox to \textwidth{\hss
   \uwave{\hspace*{126mm}}\hss}\hss}%
  \vspace{#1mm}
 \end{figure}
}
```

2.2 Special Feature of `risee-e.cls`

2.2.1 Formula

A displayed formula is aligned on the left, a fixed distance (same as `\parindent`) from the left margin, instead of being centered. A formula number is put on the right side.

Although the width of one column might be felt too narrow to compose displayed formulas, equations should be composed with the proper length, paying attention to the message "`Overfull \hbox`".

Section 3.2 describes several solutions and hints to handle a long formula.

2.2.2 Numbering of Figures and Tables

When you refer to a figure or table number, use the `\figref` and `\tabref` commands, respectively. The `\tabref{`*label*`}` generates "**Table 1**" if the table labeled with *label* is the first one in the manuscript.

2.2.3 Including Graphics

Although there are many ways to include pictures and figures in LaTeX, the Encapsulated PostScript format (EPS) is recommended.

Here is a simple explanation to insert graphics into the text.

The `graphics` or `graphicx` package must be loaded as follows.

```
\usepackage[dvips]{graphicx}
```

The option `dvips` may be changed according to the device driver you use, or may be just omitted.

A graphics file (EPS file) produced by some tools can be included with the `\includegraphics` command.

```
\begin{figure}[tb]
\begin{center}
 \includegraphics{file.eps}
\end{center}
\caption{...}
\label{fig:1}
\end{figure}
```

If the option `scale=0.5` is given, the graphics will be scaled by half.

```
\includegraphics[scale=0.5]{file.eps}
```

You can get the same result as above by using the `\scalebox` command.

```
\scalebox{0.5}{\includegraphics{file.eps}}
```

If the option `width=30mm` is given, the width of graphics will be 30 mm (with the height proportionally scaled).

```
\includegraphics[width=30mm]{file.eps}
```

The next is another example using `\resizebox`.

```
\resizebox{30mm}{!}{\includegraphics{file.eps}}
```

Both dimension of width and height can be specified as follows.

```
\includegraphics[width=30mm,height=40mm]
 {file.eps}
```

or

```
\resizebox{30mm}{40mm}
 {\includegraphics{file.eps}}
```

For further information about the graphics package, see reference book 10, 12).

2.2.4 Table

The font size inside the `table` environments is set `\footnotesize` (8 pt) (see **Table 1**).

```
\begin{table}[tb]
\caption{caption}
\label{table:1}
\begin{center}
\begin{tabular}{|c|c|c|}
\hline
 A & B & C \\
 D & E & F \\
\hline
\end{tabular}
\end{center}
\end{table}
```

2.2.5 Captions of Floating Environment

- `risee-e.cls` sets the width of caption to 75 mm (single column) and to 160 mm (double column). The width of caption can be set by changing the value of `\capwidth`.
  ```
  \capwidth=65mm
  \caption{...}
  ```
- If you would like to break a line, you can use `\\` command.
- `\label` must be located after `\caption`.

2.2.6 Bibliography and Citations

`risee-e.cls` includes the `cite.sty` and `citesort.sty` with a little customized. The `citesort.sty` collapses a list of three or more consecutive numbers into a range, and sorts the numbers before collapsing them. For example, "[6),8),5),2),1),3)]" is transformed into "[1–3, 5, 6, 8)]".

The `\cite` command displays citations as superscript numbers. To get "ref. 1)", the `\Cite` command can be used.

In the `thebibliography` environment, place references in the right order according to the ISEE editing style; e.g., authors' names, initials, title of article, journal abbreviation, volume number, pages, and publication year.

2.2.7 Verbatim Environment

You can change the values of the parameters in the verbatim environment which is customized for `risee-e.cls`. The default settings are:

```
\verbatimleftmargin=0pt
\def\verbatimsize{\small}
\verbatimbaselineskip=\baselineskip
```

The leftmargin of the verbatim environment is set 0pt. The font size is set `\small`. The baselineskip is set the same of normal texts.

For example, those parameters can be changed as follows.

```
\verbatimleftmargin=2em
\def\verbatimsize{\footnotesize}
\verbatimbaselineskip=3mm
```

2.2.8 Macros Defined by `risee-e.cls`

- `\halflineskip` and `\onelineskip`: Produce a vertical space, 0.5`\baselineskip` and 1`\baselineskip` respectively.

Table 1 `\RN` and `\MARU`

`\RN{8}`	VIII
`\MARU{1}`	①

- `\ddash`: Produce double "—". Double "`---`" sometimes produce thin space between two "—". `\ddash` will prevent such a case.
- `\QED`: Produces "□" in the end of the proof and so on. You would get the same output by using `\hfill $\Box$`. But if the end of a paragraph goes to the right margin, the character □ is positioned at the start of a line. Using `\QED` will prevent such cases.
- As shown in Table 1, the macros `\RN` and `\MARU` are defined[1)].

2.3 AMS Packages

The $\mathcal{AMS}$-LaTeX packages are provided to typeset complex equations or other mathematical constructions. If you would like to use them, the `amsmath` package should be loaded with the `fleqn` option.

```
\usepackage[fleqn]{amsmath}
```

The `amsmath` package provides many functions including the `\boldsymbol` command, which is used for individual bold math symbols and bold Greek letters. For examples, `\boldsymbol{\alpha}_1` and `A_{\boldsymbol{x}}` produces $\boldsymbol{\alpha}_1$ and $A_{\boldsymbol{x}}$, respectively. If you only need `\boldsymbol` in the `amsmath` package, then only the `amsbsy` package might be loaded.

```
\usepackage{amsbsy}
```

Once the `amssymb` package is loaded, many extra math symbols of the $\mathcal{AMS}$-LaTeX fonts will become available.

```
\usepackage[psamsfonts]{amssymb}
```

For further information about the $\mathcal{AMS}$-LaTeX package, see reference book[11)].

3. How to Prevent Typographic Errors

3.1 General Notes

(1) You should pay attention to a space after a period.
"TeX simply assumes that a period ends a sentence unless it follows an uppercase letter. This works most of the time, but not always—abbreviations like 'etc.' being the most common exception. You tell TeX that a period doesn't end a sentence by using a `\␣` command (a `\` character followed by a space or the end of a line) to make the space after the period."
"On the rare occasions that a sentence-ending period follows an uppercase letter, you will have to tell TeX that the period ends the sentence. You do this by preceding the period with a `\@` command."[10)]
`Beans (lima, etc.)\ have vitamin B\@.`

(2) "Line breaking should be prevented at certain interword spaces. ... Trying ~ (a tilde character) produces an ordinary interword space at which TeX will never break a line."[10)]
`Mr.~Jones`, `Figure~\ref{fig:1}`, `(1)~gnats`.

(3) With respect to Figure, Section, Equation, when these words appear at the beginning of a sentence, they should be spelled out in full, e.g., "Figure 1 shows..." is used. When they appear in the middle of a sentence, abbreviations, e.g., "in Fig. 1", "in Sect. 2", "in Eq. 3" should be used.

(4) There should be no space after opening or before closing parentheses, as in `(␣word␣)`.

(5) There are many cases of an inappropriate application of a `\\` or `\newline` command except in the tabular environment etc., such as two `\\` commands in succession or `\\` command just before a blank line. They will often cause warning messages like `Underfull \hbox ...`, as a result it would often prevent you from finding important warning messages. The use of `\par\noindent` or `\hfil\break` commands is recommended and gives you the same effect without warning messages.

(6) There are some cases of an inappropriate application of a `\\` in descriptions such as program lists. Use of the `tabbing` environment or `list` environment is recommended.

(7) The difference in the use of the hyphen (`-`), en dash (`--`) and em dash (`---`) should be noted. A hyphen is used in connecting English-language words such as 'well-known', and an en dash is used when expressing a range such as 'pp.298–301'. The em dash is even longer—it's used as punctuation.

(8) The difference when hyphen and en dash are used in maths mode should also be noted. Some examples are given below.
`$A^{\mathrm{b}\mbox{-}\mathrm{c}}$`
$A^{\mathrm{b}\mbox{-}\mathrm{c}}$ ⇒ hyphen
`$A^{\mathrm{b}\mbox{--}\mathrm{c}}$`
$A^{\mathrm{b}\mbox{--}\mathrm{c}}$ ⇒ en dash
`$A^{b-c}$`
A^{b-c} ⇒ minus sign

(9) The less-than sign "<" (`<`, a relation) should not be confused with "⟨" (`\langle`, a delimiter). The same is true for the greater-than sign ">" and "⟩".

(10) A unary operator and a binary operator: "A + or − that begins a formula (or certain subformulas) is assumed to be a unary operator, so typing `$-x$` produces $-x$ and typing `$\sum - x_{i}$` produces

$\sum -x_i$, with no space between the "−" and "x". If the formula is part of a larger one that is being split across lines, TEX must be told that the + or − is a binary operator. This is done by starting the formula with an invisible first term, produced by an `\mbox` command with a null argument."[10)]

```
\begin{eqnarray}
y &=& a + b + c + ... + e\\
  & & \mbox{} + f + ...
\end{eqnarray}
```

(11) `\allowbreak` may be used within long maths formulas in paragraphs instead of using `\\`, `\hfil\break` or `\linebreak`, since TEX is reluctant to break lines there.

3.2 How to Handle Long Formulas

Here are some explanations how to handle long formulas, for example, overhanged equations, equations overriding the equation number, and so forth.

Example 1:

$$y = a+b+c+d+e+f+g+h+i+j+k+l+m \quad (1)$$

The equation is too long, and the space between the equation and the equation number are too narrow and sometimes the equation number moves to the right. In this case the `\!` command is useful.

"The `\!` acts like a backspace, removing the same space amount of space that `\,` adds."[10)]

```
\begin{equation}
 y\!=\!a\!+\!b\!+\!c\!+\! ... \!+\!m
\end{equation}
```

$$y=a+b+c+d+e+f+g+h+i+j+k+l+m \quad (2)$$

Example 2: Using `eqnarray` environment instead of `equation` environment.

```
\begin{eqnarray}
 y &=& a+b+c+d+e+f+g+h\nonumber\\
   & & \mbox{}+i+j+k+l+m+n+o
\end{eqnarray}
```

To typeset above, you will get the following output.

$$\begin{aligned} y &= a+b+c+d+e+f+g+h \\ &\quad +i+j+k+l+m \end{aligned} \quad (3)$$

Example 3: To change the value of `\mathindent` is to change the position that the equation begins[*1].

```
\mathindent=0em % <-- [1]
\begin{equation}
 y=a+b+c+d+e+f+g+h+i+j+k+l+m
\end{equation}
\mathindent=1em % <-- [2] default value
```

To typeset above (see `[1]`), you will get the following output.

$$y = a+b+c+d+e+f+g+h+i+j+k+l+m \quad (4)$$

The value of `\mathindent` must be restored (see `[2]`).

Example 4:

$$\iiint_S \left(\frac{\partial V}{\partial x} - \frac{\partial U}{\partial y}\right) dxdydz = \oint_C \left(U\frac{dx}{ds} + V\frac{dy}{ds}\right) ds \quad (5)$$

The equation is too long and overrides the equation number. In this case the `\lefteqn` command is useful. It can be used for splitting long formulas across lines as follows.

```
\begin{eqnarray}
 \lefteqn{
  \int\!\!\!\!
  \int\!\!\!\!\int_S
  \left(\frac{\partial V}{\partial x}
  -\frac{\partial U}{\partial y}\right) dxdydz
 }\quad \nonumber\\
 &=& \oint_C \left(U \frac{dx}{ds}
      + V \frac{dy}{ds} \right)ds
\end{eqnarray}
```

To typeset above, you will get the following output.

$$\begin{aligned} &\iint_S \left(\frac{\partial V}{\partial x} - \frac{\partial U}{\partial y}\right) dxdy \\ &\quad = \oint_C \left(U\frac{dx}{ds} + V\frac{dy}{ds}\right) ds \end{aligned} \quad (6)$$

Example 5: A matrix using the `array` environment.

$$A = \begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{pmatrix} \quad (7)$$

The width of a matrix can be shrunk by changing the value of `\arraycolsep` or using an `@`-expression (`@{}`).

```
\begin{equation}
\arraycolsep=3pt %     <--- [1]
A = \left(
  \begin{array}{@{\hskip2pt}%%  <-- [2]
                cccc
                @{\hskip2pt}%%  <-- [2]
               }
   a_{11} & a_{12} & \ldots & a_{1n} \\
   a_{21} & a_{22} & \ldots & a_{2n} \\
   \vdots & \vdots & \ddots & \vdots \\
```

[*1] This explanation is appropriate to left-aligns displayed formulas, not to centering formulas.

```
   a_{m1} & a_{m2} & \ldots & a_{mn} \\
  \end{array}
    \right)
\end{equation}
```

The `\arraycolsep` dimension is half the width of a horizontal space between columns in the `array` environment. A matrix using the `array` environment can be shrunk by changing the value of `\arraycolsep` (see [1]). And also it can be shrunk by using `@`-expression (see [2]).

$$A = \begin{pmatrix} a_{11} & a_{12} & \ldots & a_{1n} \\ a_{21} & a_{22} & \ldots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \ldots & a_{mn} \end{pmatrix} \tag{8}$$

Compare Eqs. (7) and (8).

Example 6: A matrix using a `\pmatrix`.

```
\begin{equation}
 \def\quad{\hskip.75em\relax}% <-- [1]
 %% default setting is \hskip1em
 A = \pmatrix{
      a_{11} & a_{12} & \ldots & a_{1n} \cr
      a_{21} & a_{22} & \ldots & a_{2n} \cr
      \vdots & \vdots & \ddots & \vdots \cr
      a_{m1} & a_{m2} & \ldots & a_{mn} \cr
     }
\end{equation}
```

In the case of the equation using `\pmatrix`, the definition of `\quad` can be changed (see [1]).

If `amsmath` packages is loaded, the `pmatrix` environment must be selected instead of `\pmatrix`. In that case the explanation on Example 5 is useful.

References

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A.1. Printing on A4 paper and making pdf file

- If you print a manuscript on A4 paper by using dvips printer driver, the following parameter might be set.
  `dvips -t a4 file.dvi`
- You can directly make a pdf file by using pdflatex, or convert a dvi file to a pdf file by using dvips and Acrobat Distiller or dvipdfmx.
- If you convert a dvi file to a pdf file, you must first convert a dvi file to a ps file (`printer` is your printer name):
  `dvips -Pprinter -t a4 file.dvi`
  then, convert a ps file to pdf file by using Acrobat Distiller.

  Otherwise, you may convert a dvi file to a pdf file by using dvipdfmx.
  `dvipdfmx -p a4 file.dvi`