

MMAJ Title of Article *

First Author^a, Second Author^{a,b} and Third Author^b

^a*Institute of Mathematics and Informatics*

Akademijos 4, LT-08663, Vilnius, Lithuania

^b*Vilnius Gediminas Technical University*

Sauletekio al. 11, LT-10223, Vilnius, Lithuania

E-mail(*corresp.*): mma@vgtu.lt

E-mail: mmak@vgtu.lt

Received October 11, 2022; revised October 11, 2022; accepted 2022

Abstract. This short document explains how to use the $\LaTeX 2_{\epsilon}$ class style files. It also gives some brief advice on style.

Keywords: guide, \LaTeX .

AMS Subject Classification: ...

1 Introduction

We prefer papers to be written using $\LaTeX 2_{\epsilon}$.

We will accept the source code of papers written with an older version of \LaTeX , with \TeX itself, or with one of the other flavors. However, the macros described in this document are designed for use with $\LaTeX 2_{\epsilon}$ files.

2 Work style files

The $\LaTeX 2_{\epsilon}$ work package consists of following files:

- 1) `mma.cls`, `mma.def.tex`, ... (the class files for $\LaTeX 2_{\epsilon}$),
- 2) `plainmma.bst` (BIB \TeX plain style file for MMA journal),
- 3) `guide.tex` (`guide.pdf`) (this file),

* This guide is not an original one. Portions of it are borrowed from similar guides provided by other publishers.

- 4) `guide*.pdf` (four additional figures' files).

These files are available on the INTERNET at

URL: <http://inga.vgtu.lt/~mma/MMAStyleGuide.zip/>

In the following sections we describe how to use the macros defined in the work style(class).

The \LaTeX input file has line(command) `\begin{document}` and completes with command `\end{document}`.

```
\begin{document}
\bibliographystyle{plainmma}
```

This \LaTeX file...

```
\bibliography{x}
\end{document}
```

For bibliography we use `plainmma` style.

3 Preamble

The preamble is the part of the \LaTeX input file preceding the `\begin{document}` command.

The first lines in the preamble to your document (in fact, the first uncommented lines in your source code) *must* be like this:

```
\def\firstpage{1}
\def\lastpage{19}%number of pages
\def\mmamid{XXXX.xxxxxx}
\def\iFirst{2022}
\def\firstfootnote{0}
% mma style needs information bellow =====
\def\mmaauthor{...}%Example:% F. Author\sep S. Author \and Th. N. Author
\def\mmatitle{...}%Example:% Title of Article
\def\mmarunauthor{...}%Example:% F. Author\sep S. Author \and Th. N. Author
\def\mmaruntitle{...}%Example:% Runtitle of Article
\def\mmakeywords{...}%Example:% discrete problem, function
\def\mmaams{...}%Example:%34B24; 34B10
\def\mmareceived{\today}
\def\mmarevised{\today}
\begin{filecontents*}{mma.00}
\addcontentsline{toc}{section}{...}%Example:% First Author, Second Author
\addcontentsline{toc}{subsection}{...}%Example:% Title of Article
\end{filecontents*}
```

These lines define the your article position in our journal.

Then we describe all list of References in \BIBTeX plain style:

```
\begin{filecontents*}{x.bib}

@BOOK{book,
  author = "A. Author",
  title = "Difference methods for initial value problems",
  publisher = "Interscience Publishers, New York",
  year = "1998",
  note = "(in Russian)",
}

@ARTICLE{article-in-journal,
  author = "F. Author and S. Author and T. Author",
  title = "Article in journal",
  journal = "Journal",
  year = 1998,
  volume = 1,
  number = 2,
  pages = "3 -- 40",
}

@INPROCEEDINGS{inproceedings,
  author = "A. Author",
  title = "Article in proceedings",
  editor = "H. Ammann and V.A. Solonnikov",
  booktitle = "Proc. of the 6th Intern. Conference
              NSEC-6, Palanga, Lithuania, 1997",
  series = "Navier-Stokes Equations and Related
           Nonlinear Problems",
  pages = "255 -- 264",
  year = 1998,
  address = "Utrecht/Vilnius",
  publisher = "VSP/TEV",
}

@article{article-with-url,
  title = {Presence in Text-Based Networked Virtual Environments or '{MUDs}'},
  author = {J. Towell and E. Towell},
  journal = {Presence},
  volume = 6,
  number = 5,
  pages = {590--595},
  year = 1997,
  url = {http://www-unix.mcs.anl.gov/~towell/presence.html},
  lastchecked = {13 February 2002},
  note = "(Article with URL and lastchecked)}"
}

\end{filecontents*}
```

The list of references will be arranged in the alphabetic order of author names. Use L^AT_EX commands `\cite` or `\nocite` to refer to papers and/or books in the list of references.

The following bibliography gives sample items for a journal article [3], for a book [2], for proceedings of conferences [1] and for article wit URL [4].

The following bibliography gives sample items for a journal article~\cite{article-in-journal}, for a book~\cite{book} and for proceedings of conferences~\cite{inproceedings}.

The command `\documentclass{mma}` invokes the work style(class) file, which is based upon the standard L^AT_EX `article` style(class).

```
% ***** end Author's references *****%
\documentclass{mma}
\input{mma.def.tex}
\MAJCLS
% ***** Author's definitions *****%
\makeatletter

\spnewtheorem*{west}{Test the West}{\bfseries}{\itshape}
\@ifundefined{BibTeX}{%
\def\BibTeX{\mbox{\sc Bib\TeX}}}{%
\makeatother
% ***** end Author's definitions *****%
\begin{document}
\bibliographystyle{plainmma}
```

If you have defined any commands or environments (as `\newtheorem`, `\usepackage`, `\def`'s) in your paper, please put the relevant code in the preamble (Author's definitions).

4 Topmatter

The topmatter is a part of the document where the title, the author(s), the address(es) etc. are described.

5 The organization of your paper (sections)

5.1 Subsections

5.1.1 Subsubsections

Unless your paper is very short you should divide it into logical sections using the `\section`, `\subsection`, `\subsubsection`, `\paragraph` and `\subparagraph` commands (see, Section 5 and Subsection 5.1).

5.2 Fonts

When writing a document, appropriate fonts are normally chosen automatically by the logical tags used to structure the document. For example, the font attributes for a section heading, such as large size and bold weight, are defined by the document class and are applied when a `\section` command is used, so that you seldom need to specify font attributes yourself.

However, occasionally it becomes necessary to specify font attributes directly. One common reason is the desire to change the overall font attributes, by choosing, for example, a different font family for the main text. Another use for explicit font attributes can be to mark certain portions of the document as special – e.g., to denote examples, names, etc.

The full list of text fonts attributes is as follows:

Shape:

<code>\textup{Upright shape}</code>	(standard)	Upright shape 123;
<code>\textit{Italic shape}</code>	(or <code>\it</code>)	<i>Italic shape 123</i> ;
<code>\textsl{Slanted shape}</code>	(or <code>\sl</code>)	<i>Slanted shape 123</i> ;
<code>\textsc{Small caps shape}</code>	(or <code>\sc</code>)	SMALL CAPS SHAPE 123;

Series:

<code>\textmd{Medium series}</code>	(standard)	Medium series 123;
<code>\textbf{Boldface series}</code>	(or <code>\bf</code>)	Boldface series 123 ;

Family:

<code>\textrm{Roman family}</code>	(standard)	Roman family 123;
<code>\textsf{Sans serif family}</code>	(or <code>\sf</code>)	Sans serif family 123;
<code>\texttt{Typewriter family}</code>	(or <code>\tt</code>)	Typewriter family 123.

Names of Math font commands:

<code>{letters,etc}</code>	(standard)	<i>ABCabc</i> , 123, \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathnormal{letters}</code>		<i>ABCabc</i> , 1234567890, \vec{c} , $\Omega\omega$;
<code>\mathbm{letters,etc}</code>	(or <code>\bm</code>)	<i>ABCabc</i> , 123 , \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathrm{letters,etc}</code>	(or <code>\rm</code>)	<i>ABCabc</i> , 123, \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathbf{letters,etc}</code>	(or <code>\bf</code>)	<i>ABCabc</i> , 123 , \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathsf{letters,etc}</code>	(or <code>\sf</code>)	<i>ABCabc</i> , 123, \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathit{letters,etc}</code>	(or <code>\it</code>)	<i>ABCabc</i> , <i>123</i> , \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathtt{letters,etc}</code>	(or <code>\tt</code>)	<i>ABCabc</i> , 123, \hat{a} , \tilde{b} , \vec{c} , $\Omega\omega$;
<code>\mathcal{cap. letters}</code>	(or <code>\cal</code>)	<i>ABC</i> ;
<code>\mathscr{cap. letters}</code>	(or <code>\scr</code>)	<i>ABC</i> ;
<code>\mathbb{cap. letters}</code>	(or <code>\sym</code>)	$\mathbb{A}\mathbb{B}\mathbb{C}$;
<code>\mathfrak{lat.letters}</code>	(or <code>\frak</code>)	$\mathfrak{A}\mathfrak{B}\mathfrak{C}\mathfrak{D}abc\mathfrak{d}$, 123.

Remark 1. For **bold** type letters in math mode let use `\bm` fonts!:

`ABCabc123 $\omega\Omega$` – `\bm{ABCabc123\omega\Omega}`.

Remark 2.

1. For *Greek* letters $\Omega\omega$ in math mode let use fonts!:

`{\Omega\omega}`.

2. For *constants* e, i, d in math mode let use:

`{\E, \I, \D}`.

3. For *standard function and operators* $\tan x$, $\text{grad } f$, $\text{div } \vec{v}$ and etc. in math mode let use `\rm` fonts:

`\rm {\tan}\,x`, `\rm {grad}\,f`, `\rm {div}\,{\vec v}`.

4. For *matrix* \mathbf{A} , \mathbf{B} , \mathbf{f} in math mode let use `\bf` or `\mathbf` fonts:

`\bf{A, B, f}`.

5. For *vectors function* and *vectors* \mathbf{F} , \mathbf{f} , \mathbf{A} , \mathbf{a} in math mode let use `\bm` fonts:

`\bm{F, f}`, `\bm{A}`, `\bm{a}`.

5.3 Equations

L^AT_EX 2_ε automatically numbers displayed equations, unless you issue a `\nonumber` command.

It is the style in the work package that equation numbers appear on the right. The work style(class) file has been set up with this as the default.

Equations are numbered sequentially in each section *s* (in the form (s.1), (s.2), (s.3), ..., and so on). Theorems, lemmas, tables and figures are numbered without section number in the whole article.

Instead of some `\ref{...}` we can use:

`\eqref{...}` for labels of equations;

`\thmref{...}` for labels of theorems, lemmas, etc;

`\figref{...}` for labels of figures;

`\tabref{...}` for labels of tables.

5.4 Theorems, lemmas, etc.

When writing theorems, lemmas, etc. please use the L^AT_EX 2_ε environments. This has the usual advantages of logical markup versus visual markup. The work style(class) file defines similar theorem environments for lemmas, definitions, problems, corollaries, examples, remarks and propositions. The full list of environments is as follows:

<code>\begin{thm} ... \end{thm}</code>	Theorem
<code>\begin{lem} ... \end{lem}</code>	Lemma
<code>\begin{prop}... \end{prop}</code>	Proposition
<code>\begin{crit} ... \end{crit}</code>	Criterion
<code>\begin{rem} ... \end{rem}</code>	Remark
<code>\begin{cor} ... \end{cor}</code>	Corollary
<code>\begin{prob}... \end{prob}</code>	Problem
<code>\begin{exmp}... \end{exmp}</code>	Example
<code>\begin{alg}... \end{alg}</code>	Algorithm
<code>\begin{defn}... \end{defn}</code>	Definition
<code>\begin{hpt} ... \end{hpt}</code>	Hypothesis
<code>\begin{pres} ... \end{pres}</code>	Presumption
<code>\begin{pf} ... \end{pf}</code>	Proof
<code>\begin{pf*} ... \end{pf*}</code>	Proof-like

THE EXAMPLE:

This paper deals with the equation (5.1)

$$e^{i\pi x} = 1. \quad (5.1)$$

The equations are numbered locally within your paper.

The main results are given in the following Lemma 1 and Theorem 1.

Lemma 1. *Euler's equation*

$$e^{i\pi} = -1$$

combines the four most important numbers in mathematics in a single equation.

DEFINITION 1. The complex number i is so-called *imaginary unity*.

Example 1.

$$i^2 = -1, \mathbf{a} \neq \mathbf{a}.$$

END OF THE EXAMPLE.

This EXAMPLE in L^AT_EX 2_ε:

```
This paper deals with the equations \eqref{eq:1}
\begin{equation} {\sf e}^{\{{\sf i}\}\pi x}=1.\label{eq:1}
\end{equation}
The equations are numbered locally within your paper.
```

```
The main results are given in the following Lemma \thmref{lem:1} and
Theorem \thmref{thm:1}.
```

```
\begin{lem}
\label{lem:1} Euler's equation
\[{{\sf e}}^{\{{\sf i}\}\pi }=-1\]
combines the four most important numbers in mathematics in a single
equation.
\end{lem}
```

```
\begin{defn}
\label{defn:1} The complex number  $\${{\sf i}}\$$  is so-called
\emph{imaginary unity}.
\end{defn}
```

```
\begin{exmp}
\label{exmp:1}
\[{{\sf i}}^2=-1, \mathbf{a}\neq \mathbf{a}.\]
\end{exmp}
```

You may want to attach some comments to the name of enunciation.

Theorem 1 [Example of theorem]. *The interesting equation*

$$e^{i\pi x} = -1. \quad (5.2)$$

can be solved very simply.

This is done with an optional argument:

```
\begin{thm}[Example of theorem]
\label{thm:1}
The interesting equation
\begin{equation}
{\sf e}^{\{\sf i\}\pi x}=-1.\label{eq:2}
\end{equation}
can be solved very simply.
\end{thm}
```

You may want to have an environment for a non-numbered enunciation, e.g.:

Remark. Some authors like non-numbered remarks, propositions, etc.

Problem. Is a non-numbered proposition more impressive than a numbered one?

Test the West. *Go for it!*

Then you can use starred environment:

```
\begin{rem*}
Some authors ...
\end{rem*}

\begin{prob*}
Is a non-numbered ...?
\end{prob*}

\begin{west}
Go for it!
\end{west}
```

The `pf` environment sets the word “Proof”:

Proof. Text of the proof ... □

```
\begin{pf}
Text of the proof ...
\end{pf}
```

You may want the proof to start with the words ‘Proof of Theorem.’. This is done with an optional argument, as in the following example:

Proof of Theorem. Text of the proof ... □

```
\begin{pf*}{Proof of Theorem}
Text of the proof ...
\end{pf*}
```

6 Figures and tables

6.1 Figures

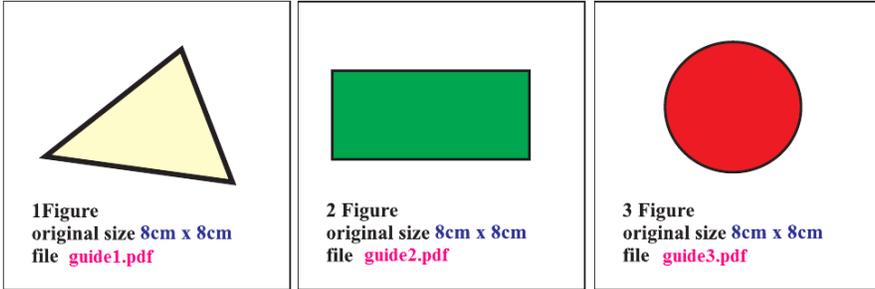
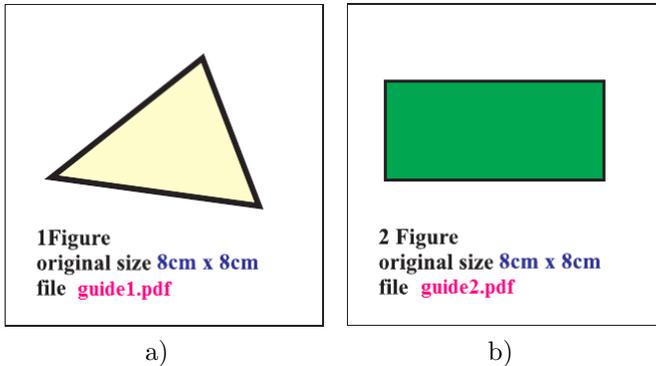


Figure 1. 1 figure.

Figure 2. 2 figure.

Figure 3. 3 figure.



a)

b)

Figure 4. Two figures.

Use the standard L^AT_EX `figure` environment (`graphicx` package) to include figures in your document. Let use the same file names for all figures, i.e. `guide.tex`, `guide1.pdf`, ..., `guide5.pdf` and so on. In examples original size of the figures files:

- 1) `guide1.pdf` – 8cm x 8cm,
- 2) `guide2.pdf` – 8cm x 8cm,
- 3) `guide3.pdf` – 8cm x 8cm,
- 4) `guide4.pdf` – 16cm x 8cm.

Example 2 [Figures: Figure 1 , Figure 2, Figure 3].

```
\begin{figure}[h]
\centering {
```

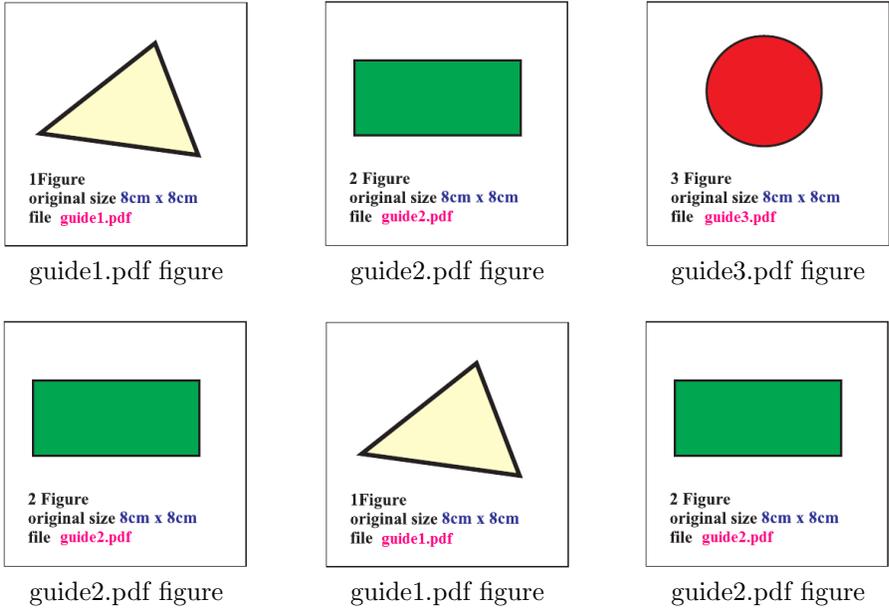


Figure 5. Six figures.

```

\begin{minipage}[t]{3.7cm}
{\includegraphics[ scale=0.45]{guide1.pdf}}
\caption{ 1th figure.}\label{fig:d1a}
\end{minipage}
\
\begin{minipage}[t]{3.7cm}
{\includegraphics[ scale=0.45]{guide2.pdf}}
\caption{ 2th figure.}\label{fig:d1b}
\end{minipage}
\
\begin{minipage}[t]{3.7cm}
{\includegraphics[ scale=0.45]{guide3.pdf}}
\caption{ 3th figure.}\label{fig:d1c}
\end{minipage}
}
\end{figure}

```

Example 3 [Figure 4].

```

\begin{figure}[ht]
\centering {
\begin{minipage}[t]{4.1cm}
{\includegraphics[ scale=0.5]{guide1.pdf}}

\centerline{a)}

```

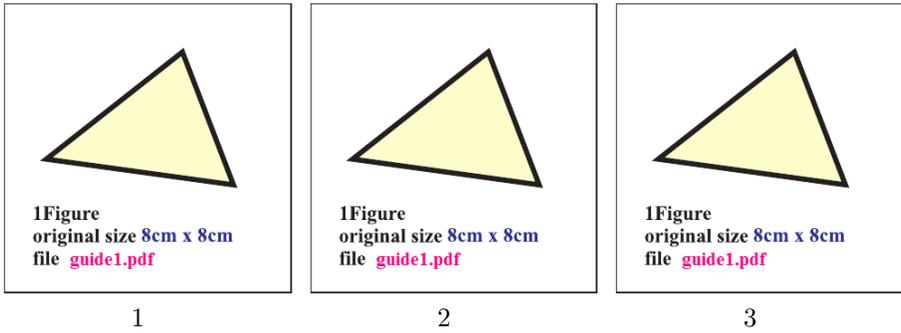


Figure 6. The same figure.

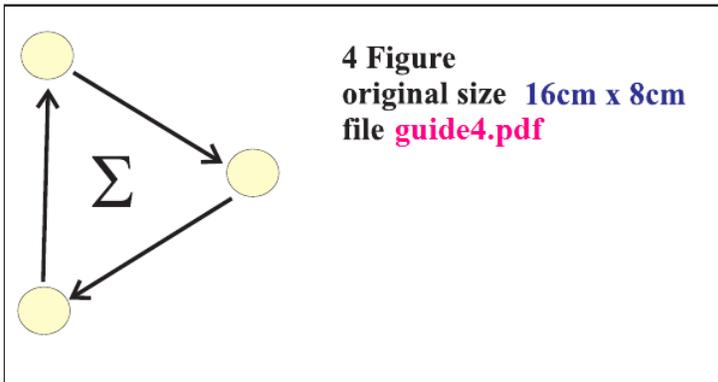


Figure 7. One figure.

```

\end{minipage}
\quad
\begin{minipage}[t]{4.1cm}
{\includegraphics[ scale=0.5]{guide2.pdf}}

\centerline{b}
\end{minipage}
}
\caption{ Two figures.}\label{fig:d2}
\end{figure}

```

Example 4 [Figure 5 (figures in table)].

```

\begin{figure}[t]
\centering {
\begin{tabular}{ccc} {\includegraphics[ scale=0.38]{guide1.pdf}}
& {\includegraphics[scale=0.38]{guide2.pdf}}&
{\includegraphics[ scale=0.38]{guide3.pdf}}\\
1.pdf figure&2.pdf figure&1.pdf figure\\

```

```

& & \\
{\includegraphics[ scale=0.38]{guide2.pdf}}&
{\includegraphics[ scale=0.38]{guide1.pdf}}&
{\includegraphics[ scale=0.38]{guide2.pdf}}\\
2.pdf figure&1.pdf figure&2.pdf figure\\
\end{tabular}
\caption{ Six figures. }\label{fig:d3}
}
\end{figure}

```

Example 5 [Figure 6].

```

\begin{figure}[h]
\centering {
\begin{minipage}[t]{3.6cm}
{\includegraphics[ scale=0.45]{guide1.pdf}}

\centerline{1}
\end{minipage}
\quad
\begin{minipage}[t]{3.6cm}
{\includegraphics[ scale=0.45]{guide1.pdf}}

\centerline{2}
\end{minipage}
\quad
\begin{minipage}[t]{3.6cm}
{\includegraphics[ scale=0.45]{guide1.pdf}}

\centerline{3}
\end{minipage}
\caption{The same figure. }\label{fig:d5}
}
\end{figure}

```

Example 6 [Figure 7].

```

\begin{figure}[h]
\centering {
\begin{minipage}[t]{10cm}
{\includegraphics[ scale=0.6]{guide4.pdf}}
\caption{One figure.}\label{fig:d1g}
\end{minipage}
}
\end{figure}

```

We can accept figures in the Portable Document Format (***.pdf** files)!

Table 1. This is an example of how a simple three-column table could look.

	<i>a</i>	<i>b</i>
<i>x</i>	1.12	0.11
<i>y</i>	10.34	0.2

6.2 Tables

Use the standard L^AT_EX `tabular` environment to set tables. Note that you should not insert vertical lines between columns. Table 1 is an example of how a three-column right-aligned table could be set. (You can change the value of `\tabcolsep` at your taste, but within a reasonable range.)

Example 7.

```
\begin{table}[t]
\beforecaption={\tabcolsep=0pt}
\caption{This is an example ...}\label{t1}
\raggedright \tabcolsep=.5cm
\begin{tabular}{rrr} \boldhline
& $a$ & $b$ \\
\hline
$x$ & 1.12 & 0.11\\
$y$ & 10.34 & 0.2\\
\boldhline
\end{tabular}
\end{table}
```

Note that the `tabular` environment has been placed inside a `table` environment. This keeps the tabular material together and allows text to flow around that material. (The two environments are distinct. A `tabular` environment allows material to be aligned in columns; a `table` environment is a logical document element that identifies its contents as belonging together and lets the contents float jointly.)

A more complicated example is Table 2:

Example 8. A more complicated example is Table 2:

```
\begin{table}[b] \beforecaption={\tabcolsep=0pt}
\caption{An example ...}\label{t2}
```

Table 2. An example of more complicated table.

	Depth			Depth with Splitting			Terminator	
	∞	32	11	∞	12	11	Standard	Splitting
Variant 1	∞	2105	unsolvable	269	65	22	∞	10
Variant 2	46	246	47	25	15	15	23	15

```

\raggedright\tabcolsep=5pt
\begin{tabular}{lcccccccc}\boldhline
& \multicolumn{3}{c}{Depth}
&& \multicolumn{3}{c}{Depth with Splitting}
&& \multicolumn{2}{c}{Terminator} \\\[2pt]
\cline{2-4}\cline{6-8}\cline{10-11}
\multicolumn{11}{l}{\[-7pt]}
& $\infty$ & $d^3$ & $d^1$ && $\infty$ & $d^2$ & $d^1$
&& Standard & Splitting \\\
Variant 1 & $\infty$ & 2105 & unsolvable && 269 & 65 &
22 && $\infty$ & 10 \\\
Variant 2 & 46 & $d^2$ & 46 & 47 && $d^2$ & $d^1$ & $d^1$
&& 23 & $d^1$ \\\
\boldhline
\end{tabular}
\end{table}

```

7 How to translate *.tex file

Edit file `name.tex` (or `template.tex`).

If the preamble is changed(new references or new title) then remove temporary files `x.bib` and `mma.00`.

Use the following commands to compile name.pdf file:

- 1) `pdflatex name.tex;`
- 2) `bibtex name;`
- 3) `pdflatex name.tex;`
- 4) `pdflatex name.tex ;`

References

- [1] A. Author. Article in proceedings. In H. Ammann and V.A. Solonnikov(Eds.), *Proc. of the 6th Intern. Conference NSEC-6, Palanga, Lithuania, 1997*, Navier-Stokes Equations and Related Nonlinear Problems, pp. 255–264, Utrecht/Vilnius, 1998. VSP/TEV. <https://doi.org/10.1007/s10625-005-0242-y>.
- [2] A. Author. *Difference methods for initial value problems*. Interscience Publishers, New York, 1998. (in Russian)
- [3] F. Author, S. Author and T. Author. Article in journal. *Journal*, **1**(2):3–40, 1998. <https://doi.org/10.1007/s10625-005-0242-y>.
- [4] J. Towell and E. Towell. Presence in text-based networked virtual environments or ‘MUDs’. *Presence*, **6**(5):590–595, 1997. <https://doi.org/10.1007/s10625-005-0242-y>. Available from Internet: <http://www-unix.mcs.anl.gov/~towell/presence.html>. (Article with URL and lastchecked)