LaTeX 2ε SVMono Document Class
Reference Guide
for
Monographs

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Contents

1 Introduction

This reference guide gives a detailed description of the SVMono LaTeX 2ε document class and its special features designed to facilitate the preparation of scientific monographs for Springer. It always comes as part of the SVMono tool package and should not be used on its own.

The components of the SVMono tool package are:

- the *Springer LaTeX class* `svmono.cls` and - if applicable - further *Springer styles* as well as the *templates* with preset class options, packages and coding examples;

  Tip: Copy all these files to your working directory, run LaTeX 2ε and produce your own example *.dvi file; rename the template files as you see fit and use them for your own input.

- *Author Instructions* with style and coding instructions *specific* to the subject area or book series you are writing for;

  Tip: Follow these instructions to set up your files, to type in your text and to obtain a consistent formal style; use these pages as checklists before you submit your ready-to-print manuscript.

- the *Reference Guide* describing the SVMono features independent of any specific style requirements.

  Tip: Use it as a reference if you need to alter or enhance the default settings of the SVMono document class and/or the templates.

The documentation in the Springer SVMono tool package is not intended to be a general introduction to LaTeX 2ε or TeX. For this we refer you to [1, 2, 3].

Should we refer in this tool package to standard tools or packages that are not installed on your system, please consult the *Comprehensive TeX Archive Network* (CTAN) at [4, 5, 6].

SVMono was derived from the LaTeX 2ε book.cls and article.cls. Should you encounter any problems or bugs in the SVMono document class please contact

`texhelp@springer.de`.

The main differences from the standard document classes `article.cls` and `book.cls` are the presence of

- multiple Springer class options,
- a number of newly built-in environments for individual text structures like theorems, exercises, lemmas, proofs, etc.,
- enhanced environments for the layout of figures and captions, and

- new declarations, commands and useful enhancements of standard environments to facilitate your math and text input and to ensure their output conforms with Springer layout standards.

Nevertheless, text, formulae, figures, and tables are typed using the standard LaTeX 2_ε commands. The standard sectioning commands are also used.

Always give a `\label` where possible and use `\ref` for cross-referencing. Such cross-references may then be converted to hyperlinks in any electronic version of your book.

The `\cite` and `\bibitem` mechanism for bibliographic references is also obligatory.

2 Basic SVMono Class Features

2.1 Initializing the Class

To use the document class, enter

```
\documentclass [⟨options⟩] {svmono}
```

at the beginning of your input.

2.2 New Class Options

Choose from the following list of class options if you need to alter the default layout settings of the Springer SVMono document class.

Page Layout *Default*: horizontal line above first level heading, all headings are displayed except for subparagraph headings, first level items of a list start with a bullet.

monohd	removes horizontal line, allows inline headings on subsubsection and paragraph level, first level list items start with a hyphen
monophys	removes horizontal line, first level list items start with a hyphen
sechang	indents second and subsequent lines in a multiline heading

Page Style *Default*: twoside, single-spaced output

referee	produces double-spaced output for proofreading
footinfo	generates a footline with name, date, ... at the bottom of each page

N.B. If you want to use both options, you must type `referee` before `footinfo`.

Font Size *Default*: 10 pt

11pt, 12pt are ignored

Language for Fixed LaTeX Texts. In the SVMono class we have changed a few standard LaTeX texts (e.g. Figure to Fig. in figure captions) and assigned names to newly defined theorem-like environments so that they conform with Springer style requirements. The *default* language is English.

deutsch translates fixed LaTeX texts into their German equivalent
francais same as above for French

Equations Style *Default*: centered layout

fleqn sets equations (and short figure and table captions) flushleft
vecphys produces boldface italic vectors when `\vec`-command is used
vecarrow depicts vectors with an arrow above when `\vec`-command is used

Numbering of Figures, Tables, Equations *Default*: chapterwise

numart numbers figures, tables, equations consecutively (not chapterwise) throughout the whole text, as in the standard article document class

Numbering and Counting of Built-in Theorem-Like Environments

For a list of built-in theorem-like environments refer to Sect. 2.7.

default setting each built-in theorem-like environment gets its own counter without any chapter or section prefix and is counted consecutively throughout the book

envcountsame all built-in environments follow a *single counter* without any chapter or section prefix, and are counted consecutively throughout the book

envcountchap each built-in environment gets its own counter and is numbered *chapterwise*

envcountsect each built-in environment gets its own counter and is numbered *sectionwise*

envcountresetchap each built-in environment gets its own counter without any chapter or section prefix but with the counter *reset for each chapter*

envcountresetsect each built-in environment gets its own counter without any chapter or section prefix but with the counter *reset for each section*

N.B.1 When the option *envcountsame* is combined with the options *envcountresetchap* or *envcountresetsect* all predefined Springer environments get the same counter; but the counter is reset for each chapter or section.

N.B.2 When the option *envcountsame* is combined with the options *envcountchap* or *envcountsect* all predefined Springer environments get a common counter with a chapter or section prefix; but the counter is reset for each chapter or section.

N.B.3 We have designed a new easy-to-use mechanism to define your own environments, see Sect. 3.4.

Use the Springer class option

nospthms	*only* if you want to suppress all Springer theorem-like environments and use the theorem environments of original LaTeX package or other theorem packages instead. (Please check this with your editor.)

References By *default*, the list of references is set as an unnumbered chapter starting on a new recto page, the running head is set lower case, the heading is entered in the table of contents, the list itself is set in small print and numbered with ordinal numbers.

sectrefs	sets the reference list as an unnumbered section e.g. at the end of a chapter
natbib	sorts reference entries in the author-year system (make sure that you have the natbib package by Patrick W. Daly installed. Otherwise it can be found at the *Comprehensive TeX Archive Network* (CTAN...tex-archive/macros/latex/contrib/supported/natbib/), see [4, 5, 6]

Use the Springer class option

oribibl	*only* if you want to set reference numbers in square brackets without automatic TOC entry etc., as is the case in the original LaTeX bibliography environment. But please note that most page layout features are nevertheless adjusted to Springer requirements. (Please check usage of this option with your editor.)

2.3 Required Packages

SVMono document class has been tested with a number of Standard LaTeX tools. Below we list and comment on a selection of recommended packages for preparing fully formatted book manuscripts for Springer Verlag. Refer to Sect. 3 for a list of other useful, but not essential, standard packages. If not installed on your system, the source of all standard LaTeX tools and packages is the *Comprehensive TeX Archive Network* (CTAN) at [4, 5, 6].

Book Layout

For some book series or subject areas Springer Verlag provides specific styles. Please check your *author instructions*, Sect. "Required Packages", for more details.

Footnotes

`footmisc.sty`	used with style option `[bottom]` places all footnotes at the bottom of the page

Figures

`graphics.sty` or `graphicx.sty`	powerful tool for including, rotating, scaling and sizing graphics files (preferrably `eps` files)

References

`cite.sty`	generates compressed, sorted lists of numerical citations: e.g. [8,11–16]; preferred style for books published in a print version only

Index

`makeidx.sty`	provides and interprets the command `\printindex` which "prints" the externally generated index file *.ind.
`multicol.sty`	balances out multiple columns on the last page of your subject index, glossary or the like

N.B. Use the *MakeIndex* program together with one of the Springer styles

`svind.ist`	for English texts
`svindd.ist`	for German texts

to generate a subject index automatically in accordance with Springer layout requirements. For a detailed documentation of the program and its usage we refer you to [1].

2.4 Recommended File and Document Structure

Save each single chapter as an individual file.

Set up a *root* file complete with all commands needed to invoke the class, the packages and your own declarations and commands.

Use the declarations

```
\frontmatter
\mainmatter
\backmatter
```

in the root file to divide your manuscript into three parts: (1) the *front matter* for the dedication, foreword, preface, and table of contents; (2) the *main matter* for the main body of your book including appendices; (3) the *back matter* for the bibliography, index, and list of symbols.

Insert the individual chapter files with the `\include` command.

Use this root file for compiling your manuscript.

2.5 New Commands in Text Mode

Use the new command

`\chapstarthook[`⟨*textwidth*⟩`]{`⟨*text*⟩`}`

to include *special text*, e.g. mottos, slogans, between the chapter heading and the actual content of the chapter.

The default width is "66 percent" of the normal textwidth, the default font size is "small", the default font shape is "italic".

In the optional argument `[`⟨*textwidth*⟩`]` alternative widths may be indicated.

The argument `{`⟨*text*⟩`}` contains the text of your inclusion. It may not contain any empty lines. To introduce vertical spaces use `\\[height]`.

The command must be placed before the `\chapter` command.

Use the new command

`\preface[`⟨*althead*⟩`]`

to typeset the heading of your preface or any other unnumbered chapter (with automatically generated runnings heads, but without automatic TOC entry).

The default heading text is "Preface". If you choose a "language" class option, it will automatically be translated.

In the optional argument `[`⟨*althead*⟩`]`, alternative headings (e.g. Foreword) may be indicated.

Use the commands

```
\chaptermark{}
\sectionmark{}
```

to alter the text of the running heads.

Use the new environment command

```
\begin{petit}
⟨text⟩
\end{petit}
```

to typeset complete paragraphs in small print.

Use the enhanced environment command

```
\begin{description}[⟨largelabel⟩]
\item[⟨label1⟩] ⟨text1⟩
\item[⟨label2⟩] ⟨text2⟩
\end{description}
```

for your individual itemized lists.

The new optional parameter `[`⟨*largelabel*⟩`]` lets you specify the largest item label to appear within the list. The texts of all items are indented by the width of ⟨*largelabel*⟩ and the item labels are typeset flush left within this space. Note, the optional parameter will work only two levels deep.

2.6 New Commands in Math Mode

Use the new or enhanced symbol commands provided by the SVMono document class:

`\D`	upright d for differential d
`\I`	upright i for imaginary unit
`\E`	upright e for exponential function
`\tens`	depicts tensors as sans serif upright
`\vec`	depicts vectors as boldface characters instead of the arrow accent

N.B. By default the SVMono document class depicts Greek letters as italics because they are mostly used to symbolize variables. However, when used as operators, abbreviations, physical units, etc. they should be set upright.

All *upright* upper-case Greek letters have been defined in the SVMono document class and are taken from the TEX alphabet.

Use the command prefix

```
\var...
```

with the upper-case name of the Greek letter to set it upright, e.g. `\varDelta`.

Many *upright* lower-case Greek letters have been defined in the SVMono document class and are taken from the PostScript Symbol font.

Use the command prefix

```
\u...
```

with the lower-case name of the Greek letter to set it upright, e.g. `\umu`.

If you need to define further commands use the syntax below as an example:

```
\newcommand{\ualpha}{\allmodesymb{\greeksym}{a}}
```

Please put this `\newcommand` in the preamble of your root file.

2.7 New Built-in Theorem-Like Environments

For individual text structures such as theorems, definitions, and examples, the SVMono document class provides a number of predefined environments which conform with the specific Springer layout requirements.

Use the environment command

```
\begin{⟨name of environment⟩}[⟨optional material⟩]
⟨text for that environment⟩
\end{⟨name of environment⟩}
```

for the newly defined *environments*. *Unnumbered environments* will be produced by

`claim` and `proof`.

Numbered environments will be produced by

`case`, `conjecture`, `corollary`, `definition`, `example`, `exercise`, `lemma`, `note`, `problem`, `property`, `proposition`, `question`, `remark`, `solution`, and `theorem`.

The optional argument `[`⟨*optional material*⟩`]` lets you specify additional text which will follow the environment caption and counter.

N.B. We have designed a new easy-to-use mechanism to define your own environments, refer to Sect. 3.4.

Use the new symbol command

```
\qed
```

to produce an empty square at the end of your proof.

In addition, use the new declaration

```
\smartqed
```

to move the position of the predefined qed symbol to be flush right (in text mode). If you want to use this feature throughout your book the declaration must be set in the preamble, otherwise it should be used individually in the relevant environment, i.e. proof.

2.8 New Commands for the Figure Environment

Use the new declaration

`\sidecaption[`⟨*pos*⟩`]`

to move the figure caption from beneath the figure (*default*) to the lower right-hand side of the figure.

The optional parameter `[t]` moves the figure caption to the upper right-hand side of the figure

N.B. (1) Make sure the declaration `\sidecaption` follows the `\begin{figure}` command, and (2) remember to use the standard `\caption{}` command for your caption text.

3 More Advanced Tips and Tricks

If the structuring and formatting of your manuscript needs more attention you may find some useful hints for this in the sections below.

Further to the packages listed in Sect.2.3, SVMono document class has been tested with the following style files.

3.1 Table of Contents

Use the command

`\setcounter{tocdepth}{number}`

to alter the numerical depth of your table of contents.

Use the macro

`\calctocindent`

to recalculate the horizontal spacing for large section numbers in the table of contents set with the following variables:

`\tocchpnum` for the	chapter number
`\tocsecnum`	section number
`\tocsubsecnum`	subsection number
`\tocsubsubsecnum`	subsubsection
`\tocparanum`	paragraph number

Set the sizes of the variables concerned at the maximum numbering appearing in the current document.

In the preamble set e.g:

```
\settowidth{\tocchpnum}{36.\enspace}
\settowidth{\tocsecnum}{36.10\enspace}
\settowidth{\tocsubsecnum}{99.88.77}
\calctocindent
```

3.2 Packages for Typesetting Mathematics

A useful package for subnumbering each line of an equation array can be found at ../tex-archive/macros/latex/contrib/supported/subeqnarray/ at the *Comprehensive TEX Archive Network*(CTAN), see [4, 5, 6].

`subeqnarray.sty` defines the `subeqnarray` and `subeqnarray*` environments, which behave like the equivalent `eqnarray` and `eqnarray*` environments, except that the individual lines are numbered as 1a, 1b, 1c, etc.

3.3 Enhanced Figure and Table Environment

Use the new declaration

`\samenumber`

within the figure environment – directly after the `\begin{figure}` command – to give the caption concerned the same counter as its predecessor (useful for long tables or figures spanning more than one page, see also the declaration `\subfigures` below.

To arrange multiple figures in a single environment use the newly defined commands

`\leftfigure[`⟨*pos*⟩`]` and `\rightfigure[`⟨*pos*⟩`]`

within a `{minipage}{\textwidth}` environment. To allow enough space between two horizontally arranged figures use `\hspace{\fill}` to separate the corresponding `\includegraphics{}` commands . The required space between vertically arranged figures can be controlled with `\\[12pt]`, for example.

The default position of the figures within their predefined space is flush left. The optional parameter `[c]` centers the figure, whereas `[r]` positions it flush right – use the optional parameter *only* if you need to specify a position other than flush left.

Use the newly defined commands

`\leftcaption{}` and `\rightcaption{}`

outside the `minipage` environment to put two figure captions next to each other.

Use the newly defined command

`\twocaptionwidth{`⟨*width*⟩`}{`⟨*width*⟩`}`

to overrule the default horizontal space of 5.4 cm provided for each of the above-described caption commands. The first argument corresponds to `\leftcaption` and the latter to `\rightcaption`.

Use the new declaration

`\subfigures`

within the figure environment – directly after the `\begin{figure}` command – to subnumber multiple captions alphabetically within a single figure-environment.

N.B.: When used in combination with `\samenumber` the main counter remains the same and the alphabetical subnumbering is continued. It works properly only when you stick to the sequence `\samenumber\subfigures`.

If you do not include your figures as electronic files use the newly defined command

`\mpicplace{`⟨*width*⟩`}{`⟨*height*⟩`}`

to leave the desired amount of space for each figure. This command draws a vertical line of the height you specified.

3.4 Enhanced Definitions for Theorem-Like Environments

In the SVMono document class the functions of the standard `\newtheorem` command have been enhanced to allow a more flexible font selection. All standard functions though remain intact (e.g. adding an optional argument specifying additional text after the environment counter).

Use the new Springer mechanism

`\spdefaulttheorem{`⟨*env name*⟩`}{`⟨*caption*⟩`}{`⟨*cap font*⟩`}{`⟨*body font*⟩`}`

to define an environment compliant with the selected class options (see Sect. 2.2) and designed as the predefined Springer theorem-like environments.

The argument `{`⟨*env name*⟩`}` specifies the environment name; `{`⟨*caption*⟩`}` specifies the environment's heading; `{`⟨*cap font*⟩`}` and `{`⟨*body font*⟩`}` specify the font shape of the caption and the text body.

N.B. If you want to use optional arguments in your definition of a new theorem-like environment as done in the standard `\newtheorem` command, see below.

Use the new Springer mechanism

```
\spnewtheorem{⟨env name⟩}[⟨numbered like⟩]{⟨caption⟩}{⟨cap font⟩}{⟨body font⟩}
```

to define an environment that shares its counter with another predefined environment [⟨*numbered like*⟩].

The optional argument [⟨*numbered like*⟩] specifies the environment with which to share the counter.

N.B. If you select the class option "envcountsame" the only valid "numbered like" argument is [theorem].

Use the newly defined Springer mechanism

```
\spnewtheorem{⟨env name⟩}{⟨caption⟩}[⟨⟨within⟩⟩]{⟨cap font⟩}{⟨body font⟩}
```

to define an environment whose counter is prefixed by either the chapter or section number (use [chapter] or [section] for [⟨*within*⟩]).

Use the newly defined declaration

```
\nocaption
```

in the argument {⟨*caption*⟩} if you want to skip the environment caption and use an environment counter only.

Use the newly defined environment

```
\begin{theopargself}
...
\end{theopargself}
```

as a wrapper to any theorem-like environment defined with the Springer mechanism. It suppresses the brackets of the optional argument specifying additional text after the environment counter.

3.5 Exercises, Problems and Solutions

If you want to include problems or exercises in your book it is best to position them as *unnumbered sections* at the end of the relevant chapters. A special *problem environment* has already been defined in SVMono document class for your convenience.

Use the environment command

```
\begin{prob}
\label{⟨problem:key⟩}
⟨problem text⟩
\end{prob}
```

to typeset each problem individually.

Please try to give a complete solution or at least a hint for each of your problems or exercises. Compile all the solutions in a separate *unnumbered solutions' chapter* and position this chapter at the end of your main text, i.e. before the references chapter.

To facilitate the correct numbering of the solutions we have also defined a *solution environment*, which takes the problem's key, i.e. ⟨*problem:key*⟩ (see above) as argument.

Use the environment syntax

```
\begin{sol}{⟨problem:key⟩}
⟨solution text⟩
\end{sol}
```

to get the correct (i.e. problem =) solution number automatically.

3.6 References

The style

`natbib.sty`	sorts reference entries in the author–year system (among other features)

N.B. This style must be installed when the class option *natbib* is used, see Sect. 2.2.

The Springer command

```
\biblstarthook{⟨text⟩}
```

allows the inclusion of explanatory *text* between the bibliography heading and the actual list of references. The command must be placed before the `thebibliography` environment.

3.7 Index

The Springer declaration

```
\threecolindex
```

sets the next index following the `\threecolindex` declaration in three columns.

The Springer declaration

```
\indexstarthook{⟨text⟩}
```

allows the inclusion of explanatory *text* between the index heading and the actual list of references. The command must be placed before the `theindex` environment.

References

[1] Lamport L. (1994) LaTeX: A Document Preparation System. 2nd ed. Addison-Wesley, Reading, Ma

[2] Goossens M., Mittelbach F., Samarin A. (1994) The LaTeX Companion. Addison-Wesley, Reading, Ma

[3] Knuth D. E. (1986) The TeX book. Addison-Wesley, Reading, Ma. and (1991) revised to cover TeX3

[4] TeX Users Group (TUG), http://www.tug.org

[5] Deutschsprachige Anwendervereinigung TeX e.V. (DANTE), Heidelberg, Germany, http://www.dante.de

[6] UK TeX Users' Group (UK-TuG), http://uk.tug.org