Using SIAM's Book Class

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Contents

1 Introduction

This file is documentation for the SIAM LATEX book macros. It provides instruction for submission of your files.

To accommodate authors who electronically typeset their manuscripts, SIAM supports the use of LATEX. To ensure quality typesetting according to SIAM style standards, SIAM provides a LATEX macro style (class) file. Using LATEX to format a manuscript should simplify the editorial process and lessen the author's proofreading burden. However, it is still necessary that the author proofread the galley proofs with care.

Final electronic files for your book will be requested by your Acquisitions contact, who will give you instructions on the best way to submit these files. When submitting your files, please be sure to include any additional macros and packages (other than those provided by SIAM) or special instructions that will be needed to generate the book.

SIAM uses Windows-based computers for LATEX processing. Therefore all filenames should be restricted to alphanumeric characters, including hyphens and underscores, plus a three-character extension.

After the manuscript is copyedited and the files are corrected, SIAM will mail the revised proofs to you so you can read them against the original edited hardcopy manuscript. SIAM is unable to shuttle varying electronic versions of each chapter back and forth, so we must rely on hardcopy galleys. Author proofreading is an important but easily overlooked step. Even if SIAM were not to introduce a single editorial change into your manuscript, there would still be a need to check the proofs because electronic transmission can introduce errors.

The distribution contains the following items: newsiambook.cls, the main macro package based on book.cls; newsiambk10.clo, for the 10-point size option; subeqn.sty, a package for equation numbering (see Section 4.3.3 for an explanation); crop.sty for placing trim marks on the page; and various art pieces

used to produce the chapter openers and part openers (see Section ??). Also included are this file, documentation.tex, and a sample file, booksample.tex. The sample file represents a standard application of the macros.

The package siammathtime.sty is a variation on the standard LATEX package mathtime.sty for producing Times Roman math and should be used only if your system has Mathtime and Mathtime Plus fonts installed.

The rest of this paper highlights some keys to effective macro use, points out options and special cases, and describes SIAM style standards to which authors should conform.

2 The Document Preamble and Class Options

If your LATEX installation includes the basic Computer Modern font set, use the following entries in your preamble:

\documentclass[optional arguments]{newsiambook}

```
\usepackage{epsfig}
\usepackage{graphicx}
\usepackage{makeidx}
\usepackage{multicol}
\usepackage{crop}
\crop
\makeindex
```

\makeindex

Using Y&YTEX with MathTime, MathTime Plus and Optima font sets, the following alternate preamble should be used:

\documentclass[optional arguments]{newsiambook}

```
\usepackage[LY1]{fontenc}
\usepackage[mtbold,LY1]{siammathtime}
\usepackage{bm}
\usepackage{epsfig}
\usepackage{graphicx}
\usepackage{makeidx}
\usepackage{multicol}
\usepackage{crop}
\crop
```

Other class options can be included in the bracketed argument of the command, separated by commas. Optional arguments include the following:

- **opener-a, opener-b, opener-c, opener-d** Provides for different formatting of the chapter openers and part openers. If no option is used, text-only openers are created.
- final Without this option, lines that extend past the margin will have black boxes next to them to help authors identify lines that they need to fix by rewriting or inserting breaks. final turns these boxes off so that very small margin breaks that are not noticeable will not cause boxes to be generated.
- **onethmnum** Using **onethmnum** numbers all theorem-like environments consecutively throughout a book with a single digit.
- mytheorems Theorem-like environments (theorem, corollary, definition, lemma, proposition) normally number together; that is, they all use the same counter. The mytheorems option allows the user to define these structures in the preamble of the document, using independent counters, if desired.

3 Frontmatter

Consisting of the table of contents; lists of figures, tables, notations and algorithms; and the preface, the frontmatter generally has roman page numbers, using the command

\frontmatter

which follows the standard \begin{document} line.

Note

You need not create your entire book as a single file. Use the standard LATEX commands \include and \includeonly to work with multiple files. See Lamport for details on usage.

3.1 Table of Contents

Use the **\tableofcontents** command to automatically create the table of contents.

3.2 Preface

Use the \begin{thepreface}...\end{thepreface} commands to create your preface.

3.3 Optional Frontmatter Items

Various lists can be generated by simply including their respective commands in the frontmatter of your manuscript:

\listoffigures
\listoftables
\listofalgorithms

Formatting is automatic.

Additionally, you can enter a list of contributors as in the following example:

\begin{contributors}
\contributor{A. Einstein}{Institute for Advanced Studies\\
Princeton University}

\contributor{Enrico Fermi}{University of Chicago}

\contributor{John von Neumann}{Institute for Advanced Studies\\
Princeton University}
\end{contributors}

The entries are automatically formatted. Note that any number of lines may be included in either argument; terminate lines with the double backslash (\\\).

4 The Body

4.1 Part Pages

Insert the command

\mainmatter

after your frontmatter. This will change page numbering to arabic, as well as reactivating chapter numbering.

If your book is divided into parts, use the standard \part command:

\part{A Sample Part Page}

4.2 Chapters

The syntax of the \chapter command follows that of the standard LATEX:

\chapter[optional text]{Chapter title}

in which optional text can be a shortened version of the chapter title, for inclusion in the running head.

Recall that the chapter and part openers are formatted according to the optional argument in the \documentclass line.

You may insert a quote following the chapter head,

```
\begin{chapterquote}[optional length]
We have nothing to fear but fear itself.\\
---{\upshape Franklin D. Roosevelt}\\[6pt]
I am not a crook.\\
---{\upshape Richard M. Nixon}
\end{chapterquote}
```

where optional length will move the entire quote block.

4.3 Standard LaTeX Commands and Extensions

At this point, all the standard LATEX commands may be employed, including

```
\section
\subsection
\subsubsection
\begin{table}...\end{table}
\begin{figure}...\end{figure}
\begin{equation}...\end{equation}
```

and, of course, all math operations and constructs. Consult Lamport or Kopka for details.

4.3.1 Lists

Although the standard \LaTeX list environments remain intact, several new list structures are available that provide cleaner formatting.

remunerate Similar to the standard enumerate, providing indented entries with arabic numerals. Use thusly:

```
\begin{remunerate}
\item Use Gauss quadrature on each interval.
\item Convert the integral to a linear combination of
        integrals of products of B-splines and provide a recurrence
        for integrating the product of a pair of B-splines.
\item Convert the sums of B-splines to piecewise
        B\'{e}zier format and integrate segment
        by segment using the properties of the Bernstein polynomials.
\item Express the product of a pair of B-splines as a linear
        combination of B-splines.
        Use this to reformulate the integrand as a linear combination
        of B-splines, and integrate term by term.
\item Integrate by parts.
\end{remunerate}
```

bulletlist Similar to the itemize environment. Creates indented entries with a bullet centered vertically on the first line of text.

```
\begin{bulletlist}
\item Use Gauss quadrature on each interval.
\item Convert the integral to a linear combination of
        integrals of products of B-splines and provide a recurrence
        for integrating the product of a pair of B-splines.
\item Convert the sums of B-splines to piecewise
        B\'{e}zier format and integrate segment
        by segment using the properties of the Bernstein polynomials.
\item Express the product of a pair of B-splines as a linear
        combination of B-splines.
        Use this to reformulate the integrand as a linear combination
        of B-splines, and integrate term by term.
\item Integrate by parts.
\end{bulletlist}
```

romannum Similar to remunerate, providing indented entries with roman numerals.

```
\begin{romannum}
\item Use Gauss quadrature on each interval.
\item Convert the integral to a linear combination of
    integrals of products of B-splines and provide a recurrence
    for integrating the product of a pair of B-splines.
\item Convert the sums of B-splines to piecewise
        B\'{e}zier format and integrate segment
        by segment using the properties of the Bernstein polynomials.
\item Express the product of a pair of B-splines as a linear
        combination of B-splines.
        Use this to reformulate the integrand as a linear combination
        of B-splines, and integrate term by term.
\item Integrate by parts.
\end{romannum}
```

4.3.2 Theorem-like Environments

The following environments are provided to create various theorem-like structures:

```
\begin{theorem}
.
.
.
\end{theorem}
```

```
\begin{lemma}
.
.
.
\end{lemma}
\begin{corollary}
.
.
.
\end{corollary}
\begin{proposition}
.
.
.
\end{proposition}
\begin{definition}
.
.
.
\end{definition}
```

Two additional environments are also provided:

```
\begin{algorithm}
.
.
.
\end{algorithm}
\begin{proof}
.
.
.
\end{proof}
```

The algorithm environment has automatic numbering and an optional title.

4.3.3 Subequations

Sometimes it is desirable to designate subequations of a larger equation number. The subequations are designated with (roman font) letters appended after the number. SIAM has supplemented its macros with the subeqn.sty, which defines the environment {subequations}.

```
\begin{subequations}\label{EKx}
\begin{equation}
  y_k = B y_{k-1} + f, \qquad k=1,2,3,\ldots
\end{equation}
for any initial vector $ y_0$. Then
\begin{equation}
  y_k\rightarrow u \mbox{\quad iff\quad} \rho(B)<1.
\end{equation}
\end{subequations}</pre>
```

All equations within the {subequations} environment will keep the same overall number, but the letter designation will increase.

4.3.4 Exercises

The exercises environment creates the Exercises heading and an automatically numbered list. Enter each new exercise using the standard \item command.

```
\begin{exercises}
\item The first problem. Solve for $x$:
\[
y=\sqrt{x + \displaystyle\frac{1}{2}}
\]
```

 $\$ The second problem. The second problem. The second problem.

The second problem. The second problem. The second problem. The second problem. The second problem. The second problem. The second problem. The second problem. \end{exercises}

4.4 Bibliography

Here we use the standard LATEX commands:

```
\backmatter
\begin{thebibliography}
.
.
.
\end{thebibliography}
```

The \backmatter command turns off chapter numbering for your Index and Bibliography. See Lamport or Kopka for details on creating the bibliography manually or with the freeware BibTeX program.

4.5 Indexing

The preamble statements

```
\usepackage{makeidx}
\makeindex
```

prepare your document for indexing. Use the standard LATEX command

\index{entry!subentry}

to insert an entry.

After inserting all indexing entries, run the public domain MakeIndex program. This utility will order and format your entries and subentries. Again, see Lamport or Kopka for details.

5 Further Reading

Goosens M., Mittlebach F. and Samarin A. (1994). *The LATEX Companion*. Addison-Wesley, Reading, MA.

Kopka H. and Daly P.W. (1999). A Guide to \(\mathbb{L}T_EX: \) Document Preparation for Beginners and Advanced Users, 3rd Ed. Addison-Wesley, Reading, MA.

Lamport L. (1994). $partial T_EX - A Document Prparation System, 2nd Ed. Updated for <math>
partial T_EX 2_{\varepsilon}$. Addison-Wesley, Reading, MA.

6 Addendum: Papers Prepared for Inclusion in Proceedings

Available as part of the SIAM Book Macro distribution is a modified version of the book class, entitled proceedings.cls.

All of the functionality of the book macros is preserved; the preceding instructions and hints are applicable. The preamble should appear as follows:

\documentclass[final]{proceedings}

```
\usepackage{epsfig}
\usepackage{graphicx}
\usepackage{makeidx}
\usepackage{multicol}
\usepackage{subeqn}
\begin{document}
\chapter[Sample File for SIAM \LaTeX\ Book Macro Package,
Proceedings Version]%
{Sample File for SIAM \LaTeX\ Book Macro Package, Proceedings
 Version\thanks{Funding for this paper furnished
by the American Taxpayers.}}
\index{Sample!file}
\begin{authorline}
H.G.~Wells\thanks{Mr.~Wells.}, S.L.~Clemens\thanks{Mark Twain.},
and H.~Melville\thanks{Call me Ishmael.}
\end{authorline}
etc.
```

Since all "chapters" stand independently:

- 1. There are no chapter numbers.
- 2. Chapter references have been removed from section heads, equations, figure and table legends, etc.
- 3. Running heads consist of page numbers only.
- 4. An \authorline environment is added.
- 5. The \thanks command is added, to include author affiliations, funding information, etc.

See the file proceedingssamp.tex for coding examples, and proceedingssamp.pdf to view a completed sample.

7 Addendum: Contributed Volumes

It is desirable to include author names in the chapter openers of books with contributed chapters; the names(s) might also appear in the table of contents. The newsiambook.cls also supports commands similar to proceedings.cls.

To insert author name(s), add the following commands following the \chapter command:

```
\authortoc{H.G.~Wells, S.L.~Clemens, H.~Melville}
\begin{authorline}
H.G.~Wells\thanks{Mr.~Wells.}, S.L.~Clemens\thanks{Mark Twain.},
and H.~Melville\thanks{Call me Ishmael.}
\end{authorline}
```

See the file contributedsamp.tex.