

Using SIAM's Book Class

John Rogosich
Techsetters, Inc.

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1 Introduction

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

To accommodate authors who electronically typeset their manuscripts, SIAM supports the use of L^AT_EX. To ensure quality typesetting according to SIAM style standards, SIAM provides a L^AT_EX macro style (class) file. Using L^AT_EX 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 L^AT_EX 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 2). 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 L^AT_EX 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 L^AT_EX 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
```

Using Y&Y \TeX 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
\makeindex
```

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 L^AT_EX 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, \quad k=1,2,3,\ldots
\end{equation}
for any initial vector  $y_0$ . Then
\begin{equation}
y_k \rightarrow u \quad \text{iff} \quad \rho(B) < 1.
\end{equation}
\end{subequations}
```

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  $x$ :
\[
y = \sqrt{x + \frac{1}{2}}
\]
```

```
\item 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. 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 Bib \TeX 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 \LaTeX : Document Preparation for Beginners and Advanced Users, 3rd Ed.* Addison-Wesley, Reading, MA.

Lamport L. (1994). *\LaTeX —A Document Preparation System, 2nd Ed. Updated for $\LaTeX 2\epsilon$* . 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}

\usepackage{crop}
\crop
\makeindex

.
.
.

\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.