GUIDE TO USING SIAM'S LaTeX STYLE*

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Abstract. Documentation is given for use of the SIAM LaTeX macros. Instructions and suggestions for compliance with SIAM style standards are also included. Familiarity with standard LaTeX commands is assumed.

Key words. LaTeX, BibTeX, SIAM Journals

AMS subject classifications.

1. Introduction.

This file is documentation for the SIAM LaTeX style, including how to typeset the main document, the BibTeX file, and any supplementary material. More information about SIAM's editorial style can be found in the style manual, available at http://www.siam.org/journals/pdf/stylemanual.pdf. The SIAM latex files can be found at http://www.siam.org/journals/auth-info.php. The files are that are distributed are given below.

- `siamart.cls` (required): Main LaTeX class file.
- `siamplain.bst` (required): Bibliographic style file for BibTeX.
- `docsiamart.tex`: Produces this documentation.
- `docsiambib.bib`: Example BibTeX database.
- `docsiamsupp.tex`: Supplemental file example and documentation.

The outline of a SIAM LaTeX article is shown in Example 1.

Example 1: Document outline

```
\documentclass{siamart}

% Packages and macros definitions go here.

\begin{document}

% Front matter goes here: title, authors, abstract, etc.
% Main body goes here.
% Appendices goes here (optional).
% Acknowledgements go here (optional).
% Bibliography goes here.

\end{document}
```

Class options can be included in the bracketed argument of the command, separated by commas. By default, lines which extend past the margin will have black boxes next to them to help authors identify lines that they need to fix, by re-writing or inserting breaks. Enabling the `final` option turns these boxes off, so that very small margin breaks which are not noticible will not cause boxes to be generated. Use the `review` option to create line numbers, useful for papers submitted to SIAM for

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§These are example author names.

review.

2. Front matter. **To do:** We should change this to set pdftitle and pdfauthor, and then also use these in setting the page headers with markboth. The title and author parts are formatted using the standard `\title`, `\author`, and `\maketitle` commands as described in Lamport [4]. If there is more than one author, the authors should be separated by the `\and` command. The addresses and support acknowledgments are added via `\thanks`. Each author's thanks should specify their address. The support acknowledgment should be put in a thanks for the title, unless specific support needs to be specified for individual authors, in which case it should follow the author address or be in a separate footnote. The header for this file was produced by the code in Example 2, including examples of various footnote specifications. **To fix:** The fourth footnote on the cover page is not aligned with the other footnotes.

Example 2: Title and authors

```
\title{Guide to Using SIAM's \LaTeX\ Style%
  \thanks{Acknowledgments such as funding go here.}}

\subtitle{\today}

\author{Dianne Doe%
  \thanks{Imagination Corp., Chicago, IL, \email{ddoe@imag.com}.}%
  \and
  Paul T. Frank%
  \thanks{Department of Mathematics, Fictional University, Boise, ID.}
  \and
  Jane E. Smith%
  \footnotemark[3] % Reuse the 3rd "thanks" footnote
  \footnotemark[4] % Define contents below
}

\maketitle

% Need to briefly change \thefootnote for inserting text explicitly
% (rather than via \thanks)
\renewcommand{\thefootnote}{\fnsymbol{footnote}}
\footnotetext[4]{These are example author names.}
\renewcommand{\thefootnote}{\arabic{footnote}}
```

Example 3 shows how to specify the page headings, with the authors' names and the title (possibly shortened to fit).

Example 3: Page headers

```
\pagestyle{myheadings}
\thispagestyle{plain}
\markboth{Dianne Doe, Paul T. Frank, and Jane E. Smith}%
{Guide to Using  SIAM'S \LaTeX\ Style}
```

Following the author and title is the abstract, key words listing, and AMS subject classifications, designated using the `abstract`, `keywords`, and `AMS` environments. Authors are responsible for providing AMS numbers which can be found on the AMS web site [1]. The abstract, keywords, and AMS subject classifications for this document were specified in Example 4.

Example 4: Abstract, keywords, and AMS classifications

```
%\newcommand{\BibTeX}{{\scshape Bib}\TeX\xspace} <- Preamble
\begin{abstract}
  Documentation is given for use of the SIAM \LaTeX\ macros.
  Instructions and suggestions for compliance with SIAM style
  standards are also included. Familiarity with standard \LaTeX\
  commands is assumed.
\end{abstract}

\begin{keywords}
  \LaTeX, \BibTeX, SIAM Journals
\end{keywords}

\begin{AMS}
\end{AMS}
```

3. Sections and cross-referencing. Sections are denoted using standard LaTeX section commands, i.e., `\section`, `\subsection`, etc. The appendices are defined the same way except that the first one is preceded by the `\appendix` command. The acknowledgment section is preceeded by `\section*{Acknowledgments}`; it comes after any appendices and before the bibliography.

SIAM uses the `cleveref` package for cross-referencing, including customizations to adhere to SIAM's style guidelines. The macros automatically determine the proper way to format standard references, including the name of the reference and the hyperlink. Use `\Cref` for a reference at the beginning of a sentence and `\cref` otherwise. A label for a section should always begin with `sec`. Example 5 shows how to reference sections.

To do: Hyperlinks are currently black, even though they are enabled. We may want to turn on some colors for testing purposes and/or to try different options.

To do: For some reason, the SIAM style does not have PDF bookmarks. Let's fix that.

To do: Explain how to automatically reference sections in the supplement.

Example 5: Right and wrong ways to reference a section

```
Inside a sentence\dots\\
Single: \cref{sec:intro}\\
Range: \cref{sec:intro,sec:front,%
sec:sec}\\
Multiple: \cref{sec:intro,sec:sec,%
sec:tab,sec:math,sec:thm}\\
Appendix: \cref{sec:changes}\\

Beginning of a sentence\dots\\
Single: \Cref{sec:intro}\\
Range: \Cref{sec:intro,sec:front,%
sec:sec}\\
Multiple: \Cref{sec:intro,sec:sec,%
sec:tab,sec:math,sec:thm}\\
Appendix: \Cref{sec:changes}\\


Just don't do it this way\dots\\
Section~\ref{sec:intro}
```

Inside a sentence...
Single: §1
Range: §§1–3
Multiple: §§1, 3–5, and 7
Appendix: Appendix A

Beginning of a sentence...
Single: Section 1
Range: Sections 1–3
Multiple: Sections 1, 3–5, and 7
Appendix: Appendix A

Just don't do it this way...
Section 1

4. Math and equations. Here we show some example equations, with numbering, and examples of referencing the equations. The SIAM LaTeX class adds the following macros by default: `\const`, `\diag`, `\grad`, `\Range`, `\rank`, `\supp`. This have the effect of rendering the item as a `mathop`. Examples 6 to 10 use many of the features of the package `amsmath` and examples from [5].

Example 6: Creating matrices

```
\Cref{eq:matrices} shows some environments for making nice matrices.
\begin{equation}\label{eq:matrices}
  S=\begin{bmatrix}1&0\\0&0\end{bmatrix}
  \quad\text{and}\quad
  C=\begin{pmatrix}1&1&0\\1&1&0\\0&0&0\end{pmatrix}.
\end{equation}
```

Equation (1) shows some environments for making nice matrices.

$$S = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \quad \text{and} \quad C = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}. \tag{1}$$

Example 7: Using SIAM-defined macros

```
% \usepackage{braket,amsfonts} <- Preamble
We use a special SIAM macro in \cref{eq:range}.
\begin{equation}\label{eq:range}
  \Range(A) = \set{ y \in \mathbb{R}^n | y = Ax }
\end{equation}
```

We use a special SIAM macro in (2).

$$\mathrm{Range}(A) = \{\, y \in \mathbb{R}^n \mid y = Ax \,\} \tag{2}$$

Example 8: Equation split across lines

```
\begin{multline}\label{eq:ml}
(a+b)^2 +c^2 + d^2 \\
= a^2 + 2ab + b^2 +c^2 + d^2
\end{multline}
```

$$(a+b)^2 + c^2 + d^2 = a^2 + 2ab + b^2 + c^2 + d^2 \tag{3}$$

Example 9: Aligned equations

```
\begin{align}
x^2 + y^2 &= z^2 \label{eq:aa}\\
x^3 + y^3 &\geq z^3 \nonumber \\
x^3 + y^3 &< z^3 \label{eq:bb}
\end{align}
```

$$x^2 + y^2 = z^2 \tag{4}$$

$$x^3 + y^3 \geq z^3$$

$$x^3 + y^3 < z^3 \tag{5}$$

To fix: May need to tell cleveref how to reference subequations.

Example 10: Subequations

```
\begin{subequations} \label{eq:foo}
\begin{align} f &= g \label{subeq:a} \\
  f' &= g' \label{subeq:b} \\
  \mathcal{L}f &= \mathcal{L}g \label{subeq:c}
\end{align}
\end{subequations}
```

$$f = g \tag{6a}$$
$$f' = g' \tag{6b}$$
$$\mathcal{L}f = \mathcal{L}g \tag{6c}$$

Example 11 shows how to reference equations using `\cref`.

Example 11: Right ways to reference equations

```
Equations are automatically referenced correctly as a single equation
\cref{eq:range}, a range of equations \cref{eq:matrices,eq:range,eq:ml},
or an arbitrary set of equations: \cref{eq:matrices,eq:ml,eq:aa,eq:bb}.

\par\smallskip
Be sure to use the correct version of the beginning of a sentence so that
the word ``Equation'' is inserted first for a single: \Cref{eq:range},
range: \Cref{eq:matrices,eq:range,eq:ml} or multiple:
\Cref{eq:matrices,eq:ml,eq:aa,eq:bb}.

\par\smallskip
\Cref{eq:foo} is an example of using the subequations environment, with
    subequations \cref{subeq:a,subeq:b,subeq:c}.
```

Equations are automatically referenced correctly as a single equation (2), a range of equations (1–3), or an arbitrary set of equations: (1) and (3–5).

Be sure to use the correct version of the beginning of a sentence so that the word "Equation" is inserted first for a single: Equation (2), range: Equations (1–3) or multiple: Equations (1) and (3–5).

Equation (6) is an example of using the subequations environment, with subequations (6a–6c).

5. Theorem-like environments. **To do:** Need to show what theorem-like environments exist, how to create new ones, and how to reference them.

6. Lists. **To do:** SIAM prefers special list styles. These should be achievable via options to the enumitem package.

7. Tables. Example 12 show the code to generate Table 1. This example uses subfloats via the `subfig` package, as well as special column options from the `array` package.

8. Figures. **To do:** Need to add Tikz and epstopdf examples in this section.

9. Supplemental material. **To do:** Explain how to do supplementary material, including LaTeX files as well as multimedia.

10. Bibliography. The SIAM BibTeX style file, now called `siamplain.bst`, has been updated to include the new keys listed below:

- `doi`: Digital object identifier, a unique alphanumeric string
- `url`: Web address, usually impermanent
- `urldate`: Date that the web address was last accessed

Example 12: Example table with subtables

```
%\usepackage{array,subfig} <- Preamble
\newcolumntype{R}{>{$}r<{$}}  %
\newcolumntype{V}[1]{>{[\;}*{#1}{R@{\;\;}}R<{\;]}} %
\begin{table}[htbp]
  \caption{Example table adapted from Kolda and Mayo \cite{KoMa14}.}
  \label{tab:KoMa14}
  \centering
  \subfloat[$\beta=1$]{
    \begin{tabular}{|c|R|V{3}|c|r@{\,$\pm$\,}l|} \hline
occ. & \multicolumn{1}{c|}{$\lambda$} & \multicolumn{4}{c|}{$\mathbf{x}$} &
fevals &  \multicolumn{2}{c|}{time (sec.)}\\ \hline
 718 & 11.3476 &  0.5544 &  0.3155 &  1.2018 &  0.0977 &   45 & 0.17 & 0.06 \\ \hline
 134 &  3.7394 &  0.2642 & -1.1056 &  0.2657 & -0.3160 &   31 & 0.12 & 0.05 \\ \hline
 144 &  2.9979 &  1.0008 &  0.4969 & -0.0212 & -0.4817 &   31 & 0.12 & 0.05 \\ \hline
   4 & \multicolumn{6}{c|}{\emph{--- Failed to converge ---}} & 0.21 & 0.10 \\ \hline
 \end{tabular}}

  \subfloat[$\beta=-1$]{
    \begin{tabular}{|c|R|V{3}|c|r@{\,$\pm$\,}l|} \hline
occ. & \multicolumn{1}{c|}{$\lambda$} & \multicolumn{4}{c|}{$\mathbf{x}$} &
fevals &  \multicolumn{2}{c|}{time (sec.)}\\ \hline
  72 & -1.1507 &  0.2291 &  0.6444 &  0.3540 & -0.8990 &   34 & 0.14 & 0.06 \\ \hline
 150 & -3.2777 &  0.8349 & -0.7603 & -0.3532 & -0.2635 &   33 & 0.14 & 0.07 \\ \hline
 148 & -3.5998 &  1.0486 &  0.6046 &  0.3736 &  0.3971 &   41 & 0.16 & 0.08 \\ \hline
 624 & -6.3985 &  0.1003 &  0.1840 &  0.5305 &  1.2438 &   48 & 0.19 & 0.08 \\ \hline
   4 & \multicolumn{6}{c|}{\emph{--- Converged to wrong solution ---}} & 0.10 & 0.11 \\ \hline
   2 & \multicolumn{6}{c|}{\emph{--- Failed to converge ---}} & 0.23 & 0.02 \\ \hline
 \end{tabular}}
\end{table}
```

Table 1: Example table adapted from Kolda and Mayo [3].

(a) $\beta = 1$

occ.	λ	$\mathbf{x}$	fevals	time (sec.)
718	11.3476	$[\ 0.5544 \quad 0.3155 \quad 1.2018 \quad 0.0977\ ]$	45	0.17 ± 0.06
134	3.7394	$[\ 0.2642 \quad -1.1056 \quad 0.2657 \quad -0.3160\ ]$	31	0.12 ± 0.05
144	2.9979	$[\ 1.0008 \quad 0.4969 \quad -0.0212 \quad -0.4817\ ]$	31	0.12 ± 0.05
4	— *Failed to converge* —			0.21 ± 0.10

(b) $\beta = -1$

occ.	λ	$\mathbf{x}$	fevals	time (sec.)
72	-1.1507	$[\ 0.2291 \quad 0.6444 \quad 0.3540 \quad -0.8990\ ]$	34	0.14 ± 0.06
150	-3.2777	$[\ 0.8349 \quad -0.7603 \quad -0.3532 \quad -0.2635\ ]$	33	0.14 ± 0.07
148	-3.5998	$[\ 1.0486 \quad 0.6046 \quad 0.3736 \quad 0.3971\ ]$	41	0.16 ± 0.08
624	-6.3985	$[\ 0.1003 \quad 0.1840 \quad 0.5305 \quad 1.2438\ ]$	48	0.19 ± 0.08
4	— *Converged to wrong solution* —			0.10 ± 0.11
2	— *Failed to converge* —			0.23 ± 0.02

- `eprint`: Archive identifier, a unique alphanumeric string
- `eprintclass`: Archive class
- `archive`: Archive URL, defaults to `http://arXiv.org/abs`
- `archivepreprint`: Archive name, defaults to "arXiv".
- `eid`: Article ID, if there are no page numbers
- `pagetotal`: Total number of pages, for use with article ID

Every entry type has been modified to include an optional link to a DOI, a URL, and/or an archive preprint reference. Additionally, the `article` entry now supports an Article ID, `eid`, and number of pages, `pagetotal`. To use this, include the following code in your LaTeX source code: `\bibliographystyle{siamplain}`.

10.1. DOI. A digital object identifier (DOI) is a unique alphanumeric string that provides a persistent link to its location on the Internet. The publisher assigns a DOI when your article is published and made available electronically. Using the `doi` field in BibTeX to specify it, as shown for [3] in Example 13; observe the new `doi` field which produces a hyperlink in the citation. Do not include the full URL, i.e., `http://dx.doi.org/` preceding the DOI.

Example 13: Example article in BibTeX

```
@Article{KoMa14,
  title =        {An Adaptive Shifted Power Method for Computing
                  Generalized Tensor Eigenpairs},
  author =       {Tamara G. Kolda and Jackson R. Mayo},
  doi =          {10.1137/140951758},
  journal =      {SIAM Journal on Matrix Analysis and Applications},
  number =       {4},
  volume =       {35},
  year =         {2014},
  month =        dec,
  pages =        {1563--1581},
}
```

10.2. URL. There is also now support for the `url` field. Generally, the DOI is preferred to the URL, since the DOIs should be a permanent references. For that reason. it is good practice to specify the last date that the URL was accessed, which is specified by the optional `urldate` field. Reference [2] produced by Example 14 shows an example of using these fields.

Example 14: Example with the URL field in BibTeX

```
@Misc{Hi14,
  author =       {Nick Higham},
  title =        {A Call for Better Indexes},
  howpublished = {SIAM Blogs},
  year =         2014,
  month =        nov,
  url =          {http://blogs.siam.org/a-call-for-better-indexes/},
  urldate =      {2015-04-05}
}
```

10.3. Preprint servers such as arXiv. More and more manuscripts on available on preprint servers. In fact, SIAM's publication policy explicitly allows the final accepted version of any article to be posted on a preprint server such as arXiv.

For an arXiv paper, the `eprint` field is used to specify identifier. The optional `eprintclass` field specifies the class. Example 15 shows the BibTeX for [7].

Example 15: Example arXiv reference in BibTeX

```
@Misc{PeKoPi14,
  title = {Accelerating Community Detection by Using {K}-core Subgraphs},
  author =       {Chengbin Peng and Tamara G. Kolda and Ali Pinar},
  eprint =       {1403.2226},
  year =         2014,
  month =        mar,
  eprintclass =  {math.NA}
}
```

Other preprint servers are supported as well, but these require specification of the `archive` and `archiveprefix`. In this case, the target URL is formed by concatenating the `archive`, a forward slash (`/`), and the `eprint`; and the text for the hyperlink is formed by concatenating the `archiveprevix`, a color (:), and the `eprint`. Example 16 shows the code to generate [8], including the preprint from PubMed. Note that this example has both the journal citation as well as the link for the preprint.

Example 16: Example PubMed reference in BibTeX

```
@Article{WoZhMeSh05,
  author =       {Woessner, Donald E. and Zhang, Shanrong and
                  Merritt, Matthew E. and Sherry, A. Dean},
  title = {Numerical Solution of the {Bloch} Equations Provides Insights
                  into the Optimum Design of {PARACEST} Agents for {MRI}},
  journal =      {Magnetic Resonance in Medicine},
  doi =          {10.1002/mrm.20408},
  volume =       53,
  number =       4,
  month =        apr,
  year =         2005,
  pages =        {790--799},
  archiveprefix = {PubMed},
  archive =      {http://www.ncbi.nlm.nih.gov/pubmed},
  eprint =       {15799055}
}
```

10.4. Article ID. Some journals use an article ID rather than page numbers. The field `eid` specifies the article ID. The optional field `pagetotal` can say the number of pages in the document. An example of an article using these fields is shown in Example 17 for citation [6].

Example 17: Example article ID reference in BibTeX

```
@Article{Ne03,
  title =        {Properties of Highly Clustered Networks},
  author =       {Newman, M. E. J.},
  doi =          {10.1103/PhysRevE.68.026121},
  journal =      {Phys. Rev. E},
  volume =       {68},
  year =         {2003},
  eid =          {026121},
  pagetotal =    6,
  month =        aug,
}
```

To do: The new siam bib file is called `siamplain.bst`. There could also be a `siamalpha.bst` for alphabetic style references per the request of David Gleich.

11. Other hyperlinks. Example 18 shows an examil of the `\email` command.

Example 18: Email hyperlink

```
To obtain the data, send email
to \email{datasets@imag.com}.
```

To obtain the data, send email to datasets@imag.com.

Appendix A. Changes. The new SIAM styles includes the following significant changes as compared to older versions:

- Removed uppercase on title.

Appendix B. Acknowledgements go here. **To do:** Something is broken. There should not be an "Appendix" starting this, and the title is missing.

REFERENCES

[1] American Mathematical Society, *Mathematics Subject Classification*, 2010, http://www.ams.org/mathscinet/msc/msc2010.html (accessed 2015/03/29).

[2] Nick Higham, *A call for better indexes*. SIAM Blogs, Nov. 2014, http://blogs.siam.org/a-call-for-better-indexes/ (accessed 2015-04-05).

[3] Tamara G. Kolda and Jackson R. Mayo, *An adaptive shifted power method for computing generalized tensor eigenpairs*, SIAM Journal on Matrix Analysis and Applications, 35 (2014), pp. 1563–1581, doi:10.1137/140951758.

[4] Leslie Lamport, *LaTeX: A Document Preparation System*, Addison–Wesley, Reading, MA, 1986.

[5] Frank Mittlebach and Michel Goossens, *The LaTeXCompanion*, Addison–Wesley, 2nd ed., 2004.

[6] M. E. J. Newman, *Properties of highly clustered networks*, Phys. Rev. E, 68 (2003), 026121 (6 pages), doi:10.1103/PhysRevE.68.026121.

[7] Chengbin Peng, Tamara G. Kolda, and Ali Pinar, *Accelerating community detection by using K-core subgraphs*, Mar. 2014, arXiv:1403.2226 [math.NA].

[8] Donald E. Woessner, Shanrong Zhang, Matthew E. Merritt, and A. Dean Sherry, *Numerical solution of the Bloch equations provides insights into the optimum design of PARACEST agents for MRI*, Magnetic Resonance in Medicine, 53 (2005), pp. 790–799, doi:10.1002/mrm.20408, PubMed:15799055.

To do: This files creates a bunch of extra files as it compiles. Not sure how to remove them.