COMPILING THE AMS AUTHOR HANDBOOKS FROM A COMPLEX SOURCE

AMS TECHNICAL SUPPORT GROUP
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ABSTRACT. Publications of the American Mathematical Society (AMS) are of several types, each based on an AMS-specific document class. Manuscripts are prepared by authors and (after editorial acceptance) are submitted to the Society's production department where they are processed for printing and publication.

In order to make this process as painless as possible for both authors and production staff, instructions for authors—the AMS Author Handbook—has been created in separate versions, one for each type of publication. Author instructions are in large part common to all publication types, with specific additions or variations as needed. The core material is contained in one large LaTeX file, with variant material selected on the basis of binary switch settings, either from embedded options or pulled in from subsidiary files. Creation and management of that exercise is the subject of this overview.

Introduction

The purpose of the present document is to explain how a four-version user manual is generated from a "single" source, consisting of a core central text, modified by or augmented with product-specific material provided by command-specified variants or additional files addressing specific topics. The manual(s) being described are entitled "AMS Author Handbook", and will be referred to collectively here as the "Handbooks".

This overview is directed toward LaTeX users who are already familiar with the general mechanics of developing packages and writing the associated documentation.

AMS publications fall into four types, each based on an AMS-specific document class:

- Journals: articles use the `amsart` document class.
- Monographs and textbooks: `amsbook` defines the core style, with variations—sometimes extensive—provided in the form of series-specific document classes.
- Proceedings and similar collections: articles are prepared using `amsproc` or a series-specific variation. There is no attempt to process a complete volume as a unit; articles are processed separately and combined later from individual `pdf` files. Front matter is also prepared separately using a dedicated `editor` class, which will not be further discussed here.
- *Memoirs*: this is a hybrid series with individual units based on `amsbook` with modifications; it is treated as a subscription journal for distribution. (The name *Memoirs* is the formal title of the publication, and each individual issue is referred to in the singular form.)

The four variations of the Handbook are launched by separate “driver” files, each of which contains only the few instructions necessary to set the scene:

```
\documentclass
%  [openany]  %     The openany option may be used for screen viewing.
  {amsbook}
\usepackage{ahandinstr-r}
\setboolean{⟨document type⟩}{true}
\input{Author_Handbook_Body}
\end{document}
```

The components are described in the following sections.

The macro package: `ahandinstr-r.sty`

This collection of macros provides commands for selecting the document type and formatting the contents.

Document type selection is controlled by two types of commands: binary switches (a.k.a. “booleans”) and macros with arguments. The latter are defined based on the switches for making the desired selection, and in turn are most often used to select small text strings or to pull in subsidiary files. Here are a couple of examples, with typical uses.

```
\newcommand{\jmp}[3]{%
        \ifjournal #1\fi
        \ifmonograph #2\fi
        \ifproceedings #3\fi
}
\jmp{\input J-Series}{\input M-Series}{\input PC-Series}

\newcommand{\notmonograph}[1]{%
        \ifmonograph
        \else #1\fi
}
\item Do not use \textbf{author-defined macros} in author names,
 titles, \notmonograph{abstract, }%
 section and theorem headings, or references;
```

Choice of a boolean or macro has been based on what seemed to be most robust and easy to maintain as the document was written or updated.

It is also possible to tailor the output for printing or reading online. The default formatting option for `amsbook` is `[openright]`; that is, start every chapter on a right-hand page. But the resulting blank pages are a distraction for online reference, so `[openany]` can be specified if that is the expected use. This option had already been applied selectively to the handbooks, to force the two-page table of contents onto a page span, and for all but the monographs version (which has a two-page introduction) to run the introduction in on the otherwise blank page following the contents. To permit this exception, while retaining the ability to follow the intended document-wide formatting, an internal option, `\if@openany`, has been added.

The subject macro package has been used in compiling the present document in order to maintain a consistent format.

Files composing the Author Handbook complex

The four versions of the Handbook are produced by separate driver files, already described in the introduction, on page 1.

- `Author_Handbook_Journals.tex`
- `Author_Handbook_Mono.tex`
- `Author_Handbook_ProcColl.tex`
- `Author_Handbook_Memo.tex`

The macro package responsible for styling the contents, `ahandinstr-r.sty`, has also been described above.

A single file, `Author_Handbook_Body.tex`, contains the main content; see page 4.

One version of the Handbook covers only a single publication, *Memoirs*; the coverage of the other three is provided as three separate lists, each in its own file to permit easy updates:

- `J-Series.tex`
- `M-Series.tex`
- `PC-Series.tex`

Each version of the Handbook contains a list of requirements tailored for the specific type of publication:

- `J-Checklist.tex`
- `M-Checklist.tex`
- `PC-Checklist.tex`
- `Mem-Checklist.tex`

Since many checklist items are identical in more than one version, they are defined as token strings. A name is assigned to each token string by the `\newtoks` command, in the macro file. The (variant) texts are defined in the body, just before the section in which each is to be used; only the token string name appears in the input text.

The content of a publication's top matter differs by publication type, so the details are provided in separate files:

- `TopMatterTags_J.tex`
- `TopMatterTags_M.tex`
- `TopMatterTags_PC.tex`
- `TopMatterTags_Mem.tex`

The requirements for graphics are common to all types of publications, but a different author is responsible for this material, so the text is in a file by itself. Several illustrations are present as `.eps` files, with equivalent `.pdf` versions.

- `Graphics_Guidelines.tex`
- `Color2Gray.eps` / `Color2Gray.pdf`
- `gamuts.eps` / `gamuts.pdf`
- `rgb-cmyk.eps` / `rgb-cmyk.pdf`
- `spectrum.eps` / `spectrum.pdf`

Finally, two chapters dealing with procedures and the bibliography complete the collection. That they are in separate files is an accident of history.

- `Submitting2AMS.tex`
- `ResourcesHelp.tex`
- `AH_Bibliography.tex`

Total distinct files in the collection making up the Handbooks: 29.

The main text file: `Author_Handbook_Body.tex`

This file contains the bulk of the text.

If a difference between versions is small (e.g., a few words), or can be represented by a compact instruction (e.g., `\input{`⟨*file name*⟩`}`, a macro with arguments denoting the requisite version(s) is used.

If the difference is extensive—more than one paragraph is changed or variations are nested—the boolean `\if` commands are used directly.

An effort has been made to avoid repetition, sometimes at the cost of input coding that is more complex than desirable. The reason for this choice is the high probability that duplicated content could be overlooked when updates are made. In the case of an instruction manual, this can affect a large number of users and result in unnecessary questions, whereas getting the input coding right usually depends on only one person or a small group.

Rather than showing involved examples here, it is more instructive to look at the actual files. Some examples of varying complexity can be found following these lines: `\chapter{Introduction}` and `\subsection{indexing}`.

Rationale for determining segmentation

As hinted at earlier, the decision to include material in a single file or multiple files is based on several factors.

For the project described here, the use of several independent driver files makes it possible to preserve the output for all versions while working on only one of them. It also makes identification of the different versions straightforward, since the appropriate version name is permanantly associated with each.

Segregation of project-specific macros in a dedicated style file (loaded with `\usepackage`) brings such benefits as the ability to use "internal" control sequence names without having to bother with `\makeatletter` and the like.

Development and maintenance of the content can easily be divided among multiple authors if it is possible to `\input` or `\include` it.

Environmental considerations affecting this document

The AMS production environment in great measure affects what is described in the Handbooks, and indeed in the present document as well. The AMS published more than 60,000 pages in 2016 from LaTeX input. To support an operation of this size, automation and consistency of input are key considerations.

The principal engine used for AMS production is pdflatex, with `dvi` output for print and `pdf` output for online posting. This supports the essential requirements that line and page breaks must be identical in the two forms of a paper or book, and also that hyperlinks must be accurately placed in the electronic version.

A third requirement is the ability to perform automated checking of graphics, which are becoming increasingly common in mathematical publications. This is, so far, all but impossible once a document is in pdf form; as a former member of the AMS technical support group once put it, "In a `pdf` file, everything is just hamburger." A line in a graph is no longer distinguishable from many other features in the file, and it is not always possible even to isolate the content of a graphic from the surrounding text. A graphic in a separate file, along with the sizing information in the `dvi` file, can be processed by a script to determine (among other things) line thickness (color-adjusted if necessary), font size, and color usage (RGB vs. CMYK), and only those graphics containing a questionable element are flagged for review by a human.

Another production decision of long standing is to use the Computer Modern fonts. Again, there are exceptions, but they must be given special handling; processing of documents using the STIX fonts will require the use of XeTEX, and the infrastructure necessary for that change is being developed. (LuaLaTeX has, until recently, been too unstable to consider for production use; even now, consistency and backward compatibility are not guaranteed, but the time may have come to study the possibility.)

Bibliography processing is supported only for BibTEX and `amsrefs`; for journals and proceedings papers, bibliography input is normalized to `amsrefs`, drawing "standard" coding and content from the MathSciNet database. `amsrefs` was developed and adopted as an alternative to BibTEX before the creation of `biblatex`, and the (rather extensive) effort to provide support for `biblatex` was therefore never undertaken.

Reporting problems

Inaccuracies or other problems in either this overview or in the various files that make up the Handbook complex can be reported to the AMS technical support group by email, to `tech-support@ams.org`. Please specify "Author Handbook" as the subject. Suggestions for improvement are welcome as well.