

Edited: 2:05pm, May 2, 2018

D

DRAFT — DRAFT — DRAFT — DRAFT

Abstract Algebra I & II

David J. Hunter & Margaret L. Morrow

Westmont College

Contents

Preface	iii
To the Instructor	iv
To the Student	v
1 Mandatory Reading	1
1.1 Getting Started	1
1.2 Student and Instructor Versions	2
2 Optional Reading	3
2.1 Theorem-like Environments	3
2.2 Packages, Commands, Styles, and Libraries	4
Notes to the Instructor	5

Preface

This document provides an introduction to the **JIBLM** journal package. As stated under the *Information for Authors* at www.jiblm.org, this downloadable template is designed to be self-explanatory, using standard LaTeX commands and allowing the author to see the formatting exactly as an accepted manuscript will appear in the journal. The form `template.tex` serves two purposes:

1. It is a guide to typesetting your course notes in JIBLM format using \LaTeX .
2. It is a template to be modified to produce your print ready submission to JIBLM.

To get started:

1. download the Submission Form,
2. download the LaTeX Template,
3. compile `template.tex` and read the output, and
4. place your notes into a copy of the file `template.tex`.

If you encounter problems, please contact the Technical Editor for assistance; we welcome feedback.

To the Instructor

This is a mandatory introduction to your course notes. For your convenience, we repeat here the *Information for Authors* from the website.

Because notes are intentionally brief, it is essential that they be written in a manner that will be usable by other instructors. For this reason, we ask that you include an introduction that will provide instructors with a clear understanding of how you have used these notes. This should be a description of the course you taught, which includes:

- its level and role within the broader curriculum,
- your expectations and grading of the students,
- any unusual characteristics of the class or classroom,
- the approximate class size(s), and
- other information that will be useful to a less-experienced instructor. A well-written introduction will minimize the instructor's need for further guidance from you.

If you choose to use the \endnotes feature described in Chapter 1.2 then you may wish to put a note in this section such as, "I have added comments on particular problems throughout the notes. These superscripts refer to endnotes in the last Chapter titled, "Notes to the Instructor."

To the Student

This is an optional introduction for the students. You may add other optional chapter-like components, such as `\chapter{Acknowledgments}`. If you begin a chapter-like component with `\chapter{}`, the component will be created but no title will appear.

Chapter 1

Mandatory Reading

1.1 Getting Started

The base requirement is a \LaTeX distribution. Once you have this, place the following three files from www.jiblm.org/jiblm/info/authorinfo.aspx into your working directory.

1. `JIBLM.tex` – This is the file containing additional \LaTeX commands beyond those of the standard book class in order to typeset a JIBLM document. You should not need to edit this file.
2. `template.tex` – This file contains the text you are currently reading.
3. A copy of `template.tex`, named `myfile.tex` or whatever you like.

You are now ready to edit `myfile.tex` which will become your submission.

1. At the top of `myfile.tex`, locate

```
%%% Begin {Title Page} %%%%%%%%%%%  
\title{Author's Package}  
\author{Paul J. Kapitza}  
\affiliation{Berry College}  
\maketitle  
%%% End {Title Page} %%%%%%%%%%%
```

and replace “Author’s Package”, “Paul J. Kapitza” and “Berry College” with the title of your course notes, your name and your affiliation.

2. Delete any of the subsequent content of `myfile.tex` that you wish with the exception of the commands `\frontmatter`, `\mainmatter`, `\backmatter` and `\end{document}` commands. The blocks of statements to be removed are easily identified as follows:

```
%%%%%%%%%%BEGIN REMOVAL {n} %%%%%%%%%%%  
....material to be removed....  
%%%%%%%%%%END REMOVAL {n} %%%%%%%%%%%
```

Your `myfile.tex` may now be filled in with your own course notes.

1.2 Student and Instructor Versions

You may wish to communicate with two different audiences, the students who will study the materials and the instructors who will teach from the materials. The `\annotation` environment enables you to create one document that serves as both a student and an instructor version. By toggling a single comment in the preamble, text and mathematics which is encased within the environment will be removed or restored upon compilation, providing two versions from the same document. Usage guidelines follow.

1. To change versions, toggle the comment symbol between the following two lines in `myfile.tex`.

```
%\StudentVersion
\InstructorVersion
```

2. Use the `\annotation` environment by placing opening and closing commands on lines separate from the material to be annotated, with no starting spaces or characters of any type on the lines containing the commands. For example:

```
\begin{annotation}
... your instructor-specific text goes here ...
\end{annotation}
```

3. If a large comment is required, place the text in a separate file and use the commands:

```
\begin{annotation}
\input{filename.tex}
\end{annotation}
```

4. Numbered sequences should be handled with caution since the automatic numbering of Chapters, Theorems, Equations, etc., is recalculated when material is removed by the environment.
5. While you may bracket anything you like using the `\annotation{}` environment, such as comments within the theorem sequence, you may wish to add annotations to the instructor as footnotes throughout the text which can be made to appear as a chapter-like component at the end of the document.¹ This document has such a component entitled *Notes to the Instructor* which will appear in the Instructor Version but not in the Student Version.² To do this:

- (a) Insert in the text itself footnotes to the instructor in the following format.

```
\begin{annotation}
\endnote{This is an example of a footnote to the instructor.}
\end{annotation}
```

- (b) After the command `\backmatter`, add the chapter-like component *Notes to the Instructor* that you see following the `\backmatter` command in `template.tex`. Only do this if you have at least one endnote; otherwise you will get an error.

Chapter 2

Optional Reading

2.1 Theorem-like Environments

Theorem environments for declarations are provided and are numbered globally. As an example of the `\theorem{}` environment consider the following typesetting example.

Theorem 1. *(The Currant minimax principle.) Let T be completely continuous self adjoint operator in a Hilbert space H . Let n be an arbitrary integer and let u_1, \dots, u_{n-1} be an arbitrary system of $n-1$ linearly independent elements of H . Denote*

$$\max_{\substack{v \in H, v \neq 0 \\ (v, u_1)=0, \dots, (v, u_{n-1})=0}} \frac{(Tv, v)}{(v, v)} = m(u_1, \dots, u_{n-1}) \quad (2.1)$$

Then the n -th eigenvalue of T is equal to the minimum of these maxima, when minimizing over all linearly independent systems u_1, \dots, u_{n-1} in H ,

$$\mu_n = \min_{u_1, \dots, u_{n-1} \in H} m(u_1, \dots, u_{n-1}) \quad (2.2)$$

Note: The above equations are automatically numbered as equation (2.1) and (2.2).

A number of theorem-like environments are included for structuring mathematical statements. Examples of these are given below in alphabetical order.

Axiom 2. *This is an axiom*

Definition 3. *This is a definition*

Lemma 4. *This is a lemma*

Problem 5. *This is a problem*

Theorem 6 (Main Theorem). *This is a theorem*

Additionally, **acknowledgment**, **algorithm**, **case**, **claim**, **conclusion**, **condition**, **conjecture**, **corollary**, **criterion**, **example**, **exercise**, **notation**, **proposition**, **remark**, **solution**, **summary**, and **proof** are available.

2.2 Packages, Commands, Styles, and Libraries

1. The following packages are used by the Journal:
 - `book`—The base book class of \TeX .
 - `time`—Make system time available.
 - `enumerate`—Extended enumeration package.
 - `amssymb`, `amsmath`, `latexsym`, `amsthm`—Symbol libraries.
 - `lettrine`—Drop-caps.
 - `mathptmx`—Times Roman type package for both math and text.
 - `fancyhdr`—Header customization.
 - `comment`—Base package for the annotation environment.
 - `endnotes`—End notes package.
2. The current Journal Style does not contain any packages which support graphics content. To include this facility, place a `\usepackage{pkg-choice}` command directly after the first command line in your text file, `\include{JIBLM}`. Popular packages available include `graphics`, `graphicx` and `epsfig`.
3. The following sectioning commands are available:
 - `\chapter{Chapter Title}` command produces a new chapter starting on a new page,
 - `\section{Section Title}` command for major sections, and
 - `\subsection{Subsection Title}` command for subsections.
4. Generally, all the styles available from \TeX are available, including:
 - Typeset text shapes include *Emphasize*, **Bold**, *Italics* and *Slanted* texts.
 - You can also typeset Roman, Sans Serif, SMALL CAPS, and Typewriter families.
 - The size tags are available; Tiny, Scriptsize, Footnotesize, Small, Normalsize, Large 1, Large 2, **Large 3**, **Huge 1** and **Huge 2**.
5. The symbol libraries included within the journal package are the `amssymb`, `amsmath`, `latexsym` and `amsthm` packages. This collection provides for most of the commonly used mathematical typesetting tools to be directly accessed. Consult your favorite \TeX reference for details. Of particular interest are the mathematical styles,
 - (a) BLACKBOARD, (e.g., $\mathbb{R}, \mathbb{Z}, \mathbb{C}$).
 - (b) *Calligraphic*, (e.g. $\mathcal{S} = \emptyset$), and
 - (c) *Fraktur*.

Notes to the Instructor

¹This is an example of a footnote to the instructor which will appear at the very end of the document.

²This is another example of a footnote to the instructor, in case you missed the first one.

You can also add any text you want here.