

# The Full Title of an AMS Book or Monograph

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*Dedicated to the memory of S. Bach.*

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A. U. Thor thanks V. Exalted.  
M. E. Two thanks his mother.

ABSTRACT. This document illustrates many features of a mathematics article,  
but we do not explain the spurious appearance of the formula  $(\nabla \times F) \cdot k = z+1$   
in this abstract.

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## Preface

This is the preface and it is created using a TeX field in a paragraph by itself containing `\chapter*{Preface}`. When the document is loaded, this appears in the edit window like a normal chapter, but it is actually an unnumbered chapter.



## CHAPTER 1

# Introduction

The introduction is entered using the usual chapter tag. Since the introduction chapter appears before the `mainmatter` TeX field, it is an unnumbered chapter. The primary difference between the preface and the introduction in this shell document is that the introduction will appear in the table of contents and the page headings for the introduction are automatically handled without the need for the `markboth` TeX field. You may use either or both methods to create chapters at the beginning of your document. You may also delete these preliminary chapters.



## CHAPTER 2

### **Purpose of this Document**

This short sample document illustrates the typeset appearance of in-line and displayed mathematics in documents. It also illustrates five levels of section headings and three kinds of lists. Finally, the document includes entries for a manual bibliography and an appendix.



## Sample Mathematics and Text

### 1. In-line and Displayed Mathematics

The expression  $\sum_{i=1}^{\infty} a_i$  is in-line mathematics, while the numbered equation

$$(3.1) \quad \sum_{i=1}^{\infty} a_i$$

is displayed and automatically numbered as equation 3.1.

Let  $H$  be a Hilbert space,  $C$  be a closed bounded convex subset of  $H$ ,  $T$  a nonexpansive self map of  $C$ . Suppose that as  $n \rightarrow \infty$ ,  $a_{n,k} \rightarrow 0$  for each  $k$ , and  $\gamma_n = \sum_{k=0}^{\infty} (a_{n,k+1} - a_{n,k})^+ \rightarrow 0$ . Then for each  $x$  in  $C$ ,  $A_n x = \sum_{k=0}^{\infty} a_{n,k} T^k x$  converges weakly to a fixed point of  $T$  [1].

Two sets of L<sup>A</sup>T<sub>E</sub>X parameters govern mathematical displays.<sup>1</sup> The spacing above and below a display depends on whether the lines above or below are short or long, as shown in the following examples.

A short line above:

$$x^2 + y^2 = z^2$$

and a short line below.

A long line above may depend on your margins

$$\sin^2 \theta + \cos^2 \theta = 1$$

as will a long line below. This line is long enough to illustrate the spacing for mathematical displays, regardless of the margins.

### 2. Mathematics in section heads $\int_{\alpha}^{\beta} \ln t dt$

Mathematics can appear in section heads. Note that mathematics in section heads may cause difficulties in typesetting styles with running headers or table of contents entries.

### 3. Theorems, Lemmata, and Other Theorem-like Environments

A number of theorem-like environments is available. The following lemma is a well-known fact on differentiation of asymptotic expansions of analytic functions.

LEMMA 1. *Let  $f(z)$  be an analytic function in  $\mathbb{C}_+$ . If  $f(z)$  admits the representation*

$$f(z) = a_0 + \frac{a_1}{z} + o\left(\frac{1}{z}\right),$$

---

<sup>1</sup>L<sup>A</sup>T<sub>E</sub>X automatically selects the spacing depending on the surrounding line lengths.

for  $z \rightarrow \infty$  inside a cone  $\Gamma_\varepsilon = \{z \in \mathbb{C}_+ : 0 < \varepsilon \leq \arg z \leq \pi - \varepsilon\}$  then

$$(3.2) \quad a_1 = -\lim_{z \rightarrow \infty} z^2 f'(z), \quad z \in \Gamma_\varepsilon.$$

PROOF. Change  $z$  for  $1/z$ . Then  $\Gamma_\varepsilon \rightarrow \bar{\Gamma}_\varepsilon = \{z \in \mathbb{C}_- : \bar{z} \in \Gamma_\varepsilon\}$  and

$$(3.3) \quad f(1/z) = a_0 + a_1 z + o(z).$$

Fix  $z \in \bar{\Gamma}_\varepsilon$ , and let  $C_r(z) = \{\lambda \in \mathbb{C}_- : |\lambda - z| = r\}$  be a circle with radius  $r = |z| \sin \varepsilon/2$ . It follows from (3.3) that

$$(3.4) \quad \frac{1}{2\pi i} \int_{C_r(z)} \frac{f(\lambda) d\lambda}{(\lambda - z)^2} = \sum_{m=0}^1 a_m \frac{1}{2\pi i} \int_{C_r(z)} \frac{(\lambda - z_0)^m d\lambda}{(\lambda - z)^2} + R(z),$$

where for the remainder  $R(z)$  we have

$$\begin{aligned} |R(z)| &\leq r^{-1} \max_{\lambda \in C_r(z)} o(|z|) = r^{-1} \max_{\lambda \in C_r(z)} |\lambda| \cdot O(|z| + r) \\ &= \frac{|z| + r}{r} \cdot O(|z| + r) = \frac{1 + \sin \varepsilon}{\sin \varepsilon} \cdot O(|z|). \end{aligned}$$

Therefore  $R(z) \rightarrow 0$  as  $z \rightarrow \infty$ ,  $z \in \bar{\Gamma}_{\varepsilon/2}$ , and hence by the Cauchy theorem (3.4) implies

$$\frac{d}{dz} f(1/z) = a_1 + R(z) \rightarrow a_1, \text{ as } z \rightarrow \infty, z \in \bar{\Gamma}_{\varepsilon/2},$$

that implies (3.2) by substituting  $1/z$  back for  $z$ .  $\square$

## 4. Section Headings

Use the Section tag for major sections, such as the one just above. Four additional heading levels are available, as described below.

**4.1. Subsection Heading.** This text appears under a subsection heading.

4.1.1. *Subsubsection Heading.* This text appears under a subsubsection heading.

Subsubsubsection Heading. This text appears under a subsubsubsection heading.

Subsubsubsubsection Heading. This text appears under a subsubsubsubsection heading.

## 5. Tags

You can apply the logical markup tag *Emphasized*.

You can apply the visual markup tags **Bold**, *Italics*, Roman, **Sans Serif**, *Slanted*, **SMALL CAPS**, and **Typewriter**.

You can apply the special, mathematics only, tags **BLACKBOARD BOLD**, *CALLIGRAPHIC*, and **fraktur**. Note that blackboard bold and calligraphic are correct only when applied to uppercase letters A through Z.

You can apply the size tags `tiny`, `scriptsize`, `footnotesize`, `small`, `normalsize`, `large`, `Large`, `LARGE`, `huge` and `Huge`.

Following is a group of paragraphs marked as `Body Quote`. This environment is appropriate for a short quotation or a sequence of short quotations.

The only thing we have to fear is fear itself. *Franklin D. Roosevelt*, Mar. 4, 1933

Ask not what your country can do for you; ask what you can do for your country. *John F. Kennedy*, Jan. 20, 1961

There is nothing wrong with America that cannot be cured by what is right with America. *William J. "Bill" Clinton*, Jan. 21, 1993

## 6. Lists

Bullet, numbered and description list environments are available. Lists, which can extend four levels deep, look like this:

- (1) Numbered list item 1.
- (2) Numbered list item 2.
  - (a) A numbered list item under a list item.
 

The typeset appearance for this level is often different from the screen appearance. The typeset appearance often uses parentheses around the level indicator.
  - (b) Another numbered list item under a list item.
    - (i) Third level numbered list item under a list item.
      - (A) Fourth and final level of numbered list items allowed.
- Bullet item 1.
- Bullet item 2.
  - Second level bullet item.
    - \* Third level bullet item.
      - Fourth and final level bullet item.

**Description List:** Each description list item has a lead-in followed by the item. Double-click the lead-in box to enter or customize the text of the lead-in.

**Bunyip:** Mythical beast of Australian Aboriginal legends.

## 7. About the Bibliography

Following the text of this article is a short manual bibliography. This sample bibliography has no relationship to the previous text, but it shows sample citations such as [4], [5] and [6]. You can also have multiple citations appear together. Here is an example: [2, 3, 4].



## APPENDIX A

### **The First Appendix**

The appendix fragment is used only once. Subsequent appendices can be created using the Chapter Section/Body Tag.



## Afterword

The back matter often includes one or more of an index, an afterword, acknowledgements, a bibliography, a colophon, or any other similar item. In the back matter, chapters do not produce a chapter number, but they are entered in the table of contents. If you are not using anything in the back matter, you can delete the back matter TeX field and everything that follows it.



## Bibliography

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