

Enhanced Zeta Theme Guide

A Comprehensive Demonstration of Professional Features

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Abstract

This document demonstrates the enhanced `atrajit` (zeta) theme with professional features including keyboxes, elegant section breaks, mathematical set shortcuts, text highlighting, and more. All features maintain the classic blue color palette with zeta-themed decorations.

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1 Introduction to Enhanced Features

The enhanced `atrajit` package provides a complete professional look for mathematical documents with the following key features:

- Professional blue color palette (`zetaPrimary`, `zetaSecondary`, `zetaAccent`)
- Elegant decorative elements throughout
- Enhanced theorem environments
- Keybox highlighting for important formulas
- Mathematical set notation shortcuts
- Text highlighting macros
- Reference shortcuts

1.1 Color Scheme

The theme uses a sophisticated academic blue palette:

- **Primary:** Deep Blue for main elements
- **Secondary:** Royal Blue for accents
- **Accent:** Cornflower Blue for highlights

2 Mathematical Set Shortcuts

2.1 Common Sets

The package provides convenient shortcuts for standard mathematical sets:

\mathbb{R} (Real numbers), \mathbb{Q} (Rationals), \mathbb{Z} (Integers), \mathbb{N} (Natural numbers),
 \mathbb{C} (Complex numbers)

Usage:

```
\RR    Real numbers
\QQ    Rational numbers
\ZZ    Integers
\NN    Natural numbers
\CC    Complex numbers
```



3 Keybox Feature

3.1 Highlighting Important Formulas

Use `\keybox{...}` to highlight key equations and important content:

Euler's Identity:

$$e^{i\pi} + 1 = 0$$

This beautiful equation connects five fundamental mathematical constants.

3.2 Multiple Equations in Keybox

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} \quad (1)$$

$$\zeta(2) = \frac{\pi^2}{6} \quad (2)$$



4 Text Highlighting Macros

4.1 Mathematical Terms

Emphasize important mathematical terms using `\mathterm{...}`:

The **eigenvalue** of a matrix is a scalar that satisfies the characteristic equation. The concept of **convergence** is fundamental in analysis.

4.2 Definition Terms

Use `\defterm{...}` for defining new concepts:

A *metric space* is a set equipped with a distance function. We say a sequence is *Cauchy* if its terms become arbitrarily close.



4.3 Code and Notation

Use `\code{...}` for inline code or special notation:

The function `zeta(s)` computes the Riemann zeta function. Use `integrate(f, a, b)` for numerical integration.



5 Theorem Environments

5.1 Standard Theorems

Theorem 5.1.1 (Fundamental Theorem of Calculus). *Let f be continuous on $[a, b]$. Then*

$$\int_a^b f(x) dx = F(b) - F(a)$$

where F is any antiderivative of f .

Proof. This follows from the definition of the definite integral. □

Lemma 5.1.2. *Every convergent sequence in \mathbb{R}^n is bounded.*

Proposition 5.1.3. *The intersection of two open sets is open.*

Corollary 5.1.4. *The set of irrational numbers is uncountable.*

5.2 Definitions and Examples

Definition 5.2.1 (Topology). A *topology* on a set X is a collection \mathcal{T} of subsets of X satisfying:

1. $\emptyset, X \in \mathcal{T}$
2. Arbitrary unions of sets in \mathcal{T} are in \mathcal{T}
3. Finite intersections of sets in \mathcal{T} are in \mathcal{T}

Example 5.2.2. *The standard topology on \mathbb{R} is generated by open intervals (a, b) .*

Remark 5.2.3. Not every collection of subsets forms a topology.

Note 5.2.4. This is a useful note about the concept being discussed.



6 Custom Markers

6.1 TODO Items


Use `\todotea` for tasks that need attention:

TODO  Complete the proof of convergence for the series.

TODO  Add references to recent papers on this topic.


6.2 Important Notes

Use `\notebell` for important notes:

 **Note:** This assumption is crucial for the proof to work.

6.3 Critical Information

Use `\importantmark` for warnings or critical information:

 **Important:** The function must be continuous for this theorem to apply.



7 Reference Shortcuts

7.1 Theorem References

The package provides convenient shortcuts for referencing theorems:

Theorem 7.1.1. *This is an important theorem.*

Lemma 7.1.2. *This is a key lemma.*

Later in the document, you can reference them using shortcuts:

Usage:

```
\thmref{thm:main}    % Theorem~\ref{thm:main}
\lemref{lem:key}      % Lemma~\ref{lem:key}
\propref{prop:basic}  % Proposition~\ref{prop:basic}
\corref{cor:result}   % Corollary~\ref{cor:result}
\defref{def:space}    % Definition~\ref{def:space}
\exref{ex:simple}     % Example~\ref{ex:simple}
```

Examples: Theorem 7.1.1 is important, and Lemma 7.1.2 supports it.





8 Section Breaks

Use `\sectionbreak` to add elegant ornamental dividers between sections or subsections. This creates a professional visual separation with:

- Ornamental horizontal lines
- Diamond symbols
- Central zeta circle badge
- Decorative dots at the ends

The section break appears throughout this document between major sections.

9 Advanced Examples

9.1 Complex Mathematical Content

Multiple Zeta Values:

$$\zeta(k_1, k_2, \dots, k_r) = \sum_{n_1 > n_2 > \dots > n_r > 0} \frac{1}{n_1^{k_1} n_2^{k_2} \dots n_r^{k_r}}$$

Theorem 9.1.1 (Stuffle Product). *For positive integers k_1, k_2 , we have:*

$$\zeta(k_1)\zeta(k_2) = \zeta(k_1, k_2) + \zeta(k_2, k_1) + \zeta(k_1 + k_2)$$

9.2 Using Multiple Features

The **Riemann zeta function** $\zeta(s)$ is defined for $s \in \mathbb{C}$ with $\Re(s) > 1$ by:

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} = \prod_{p \text{ prime}} \frac{1}{1 - p^{-s}}$$

Note: The product formula shows the deep connection between $\zeta(s)$ and prime numbers.

Definition 9.2.1 (Analytic Continuation). The *analytic continuation* of $\zeta(s)$ extends the function to all $s \in \mathbb{C} \setminus \{1\}$.



10 Equation Numbering

10.1 Default Numbering

By default, equations are numbered by section:

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi} \quad (3)$$

10.2 Subsection Numbering

Use `\useSubsectionEqNum` to number equations by subsection (as shown in `main.tex`).

10.3 Subsubsection Numbering

Use `\useSubsubsectionEqNum` to number equations by subsubsection:

`\useSubsubsectionEqNum`

11 Hyperlink Styling

The theme includes professional hyperlink styling with colored links:

- Internal links (sections, equations): [Deep Blue](#)
- Citations: [Royal Blue](#)
- URLs: [Cornflower Blue](#)

All links are properly configured with bookmarks and navigation features.



12 Best Practices

12.1 When to Use Keyboxes

Use keyboxes for:

1. Main theorems and results
2. Key formulas that should stand out
3. Important definitions
4. Summary equations

12.2 Section Organization

Use `\sectionbreak` between:

- Major sections or exercises
- Different topics within a section
- Before and after important results

12.3 Text Highlighting

- Use `\mathterm{}` for technical mathematical terms
- Use `\defterm{}` when first introducing a concept
- Use `\code{}` for notation, functions, or algorithms

13 Conclusion

The enhanced `atrajit` (zeta) theme provides a complete professional toolkit for mathematical documents. Key features include:

Summary of Features:

- Professional blue color palette
- Keybox highlighting: `\keybox{...}`
- Mathematical sets: `\RR`, `\QQ`, `\ZZ`, `\NN`, `\CC`
- Text highlighting: `\mathterm{}`, `\defterm{}`, `\code{}`
- Custom markers: `\todotea`, `\notebell`, `\importantmark`
- Reference shortcuts: `\thmref{}`, `\lemref{}`, etc.
- Elegant section breaks: `\sectionbreak`



Happy typesetting with the enhanced Zeta theme!