



博士学位论文



泽学的前世今生

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摘 要

本文是中国科学技术大学本硕博毕业论文 \LaTeX 模板示例文件。本模板由 zepinglee 和 seisman 创建，其前身是 ywg@USTC 创建的本硕博论文通用模板。本模板遵循中国科学技术大学的论文写作规范，适用于撰写学士、硕士和博士学位论文。

本示例文档中会演示如何使用 \LaTeX 的一些基本命令以及本模板提供的一些特殊功能，模板的选项及详细用法请参考模板说明文档 `ustcthesis.pdf`。

关键词：中国科学技术大学 学位论文 \LaTeX 通用模板 学士 硕士 博士
示例文档 模板说明文档

ABSTRACT

This is a sample document of USTC thesis \LaTeX template for bachelor, master and doctor. The template is created by zepinglee and seisman, which originate from the template created by ywg@USTC. The template meets the requirements of USTC thesis writing standards.

This document will show the usage of basic commands provided by \LaTeX and some features provided by the template. For more information, please refer to the template document `ustcthesis.pdf`.

Key Words: University of Science and Technology of China (USTC), Thesis, Universal \LaTeX Template, Bachelor, Master, PhD

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符号说明

$\ln x$	natural logarithm $\log_e x$
$\log x$	common logarithm $\log_{10} x$
$x \bmod y$	remainder

第 1 章 简介

1.1 模板简介

测试脚注¹。

1.1.1 模板介绍 1

1.1.1.1 模板测试

1.1.2 模板介绍 2

1.2 系统要求

1.3 问题反馈

测试脚注²

¹分别编号

²脚注 2

第2章 数学

2.1 定理、引理和证明

定义 2.1 If the integral of function f is measurable and non-negative, we define its (extended) **Lebesgue integral** by

$$\int f = \sup_g \int g, \quad (2.1)$$

where the supremum is taken over all measurable functions g such that $0 \leq g \leq f$, and where g is bounded and supported on a set of finite measure.

例 2.1 Simple examples of functions on \mathbb{R}^d that are integrable (or non-integrable) are given by

$$f_a(x) = \begin{cases} |x|^{-a} & \text{if } |x| \leq 1, \\ 0 & \text{if } |x| > 1. \end{cases} \quad (2.2)$$

$$F_a(x) = \frac{1}{1 + |x|^a}, \quad \text{all } x \in \mathbb{R}^d. \quad (2.3)$$

Then f_a is integrable exactly when $a < d$, while F_a is integrable exactly when $a > d$.

引理 2.1 (Fatou) Suppose $\{f_n\}$ is a sequence of measurable functions with $f_n \geq 0$. If $\lim_{n \rightarrow \infty} f_n(x) = f(x)$ for a.e. x , then

$$\int f \leq \liminf_{n \rightarrow \infty} \int f_n. \quad (2.4)$$

注 We do not exclude the cases $\int f = \infty$, or $\liminf_{n \rightarrow \infty} \int f_n = \infty$.

推论 2.2 Suppose f is a non-negative measurable function, and $\{f_n\}$ a sequence of non-negative measurable functions with $f_n(x) \leq f(x)$ and $f_n(x) \rightarrow f(x)$ for almost every x . Then

$$\lim_{n \rightarrow \infty} \int f_n = \int f. \quad (2.5)$$

命题 2.3 Suppose f is integrable on \mathbb{R}^d . Then for every $\epsilon > 0$:

- i. There exists a set of finite measure B (a ball, for example) such that

$$\int_{B^c} |f| < \epsilon. \quad (2.6)$$

ii. There is a $\delta > 0$ such that

$$\int_E |f| < \epsilon \quad \text{whenever } m(E) < \delta. \quad (2.7)$$

定理 2.4 Suppose $\{f_n\}$ is a sequence of measurable functions such that $f_n(x) \rightarrow f(x)$ a.e. x , as n tends to infinity. If $|f_n(x)| \leq g(x)$, where g is integrable, then

$$\int |f_n - f| \rightarrow 0 \quad \text{as } n \rightarrow \infty, \quad (2.8)$$

and consequently

$$\int f_n \rightarrow \int f \quad \text{as } n \rightarrow \infty. \quad (2.9)$$

证明 Trivial. □

2.2 自定义

Axiom of choice Suppose E is a set and E_α is a collection of non-empty subsets of E . Then there is a function $\alpha \mapsto x_\alpha$ (a “choice function”) such that

$$x_\alpha \in E_\alpha, \quad \text{for all } \alpha. \quad (2.10)$$

Observation 1 Suppose a partially ordered set P has the property that every chain has an upper bound in P . Then the set P contains at least one maximal element.

A concise proof Obvious. □

第 3 章 算法环境

模板中使用 `algorithm2e` 宏包实现算法环境。关于该宏包的具体用法，请阅读宏包的官方文档。

```
Data: this text
Result: how to write algorithm with LATEX2ε
1 initialization;
2 while not at end of this document do
3   | read current;
4   | if understand then
5   |   | go to next section;
6   |   | current section becomes this one;
7   | else
8   |   | go back to the beginning of current section;
9   | end
10 end
```

算法 3.1: 算法示例 1

```

input : A bitmap  $Im$  of size  $w \times l$ 
output: A partition of the bitmap

1 special treatment of the first line;
2 for  $i \leftarrow 2$  to  $l$  do
3   special treatment of the first element of line  $i$ ;
4   for  $j \leftarrow 2$  to  $w$  do
5      $left \leftarrow \text{FindCompress}(Im[i, j - 1]);$ 
6      $up \leftarrow \text{FindCompress}(Im[i - 1,]);$ 
7      $this \leftarrow \text{FindCompress}(Im[i, j]);$ 
8     if  $left$  compatible with  $this$  then //  $O(left, this) == 1$ 
9       if  $left < this$  then  $\text{Union}(left, this);$ 
10      else  $\text{Union}(this, left);$ 
11    end
12    if  $up$  compatible with  $this$  then //  $O(up, this) == 1$ 
13      if  $up < this$  then  $\text{Union}(up, this);$ 
14      //  $this$  is put under  $up$  to keep tree as
15      flat as possible
16      else  $\text{Union}(this, up);$ 
17      //  $this$  linked to  $up$ 
18    end
19  end
20 foreach element  $e$  of the line  $i$  do  $\text{FindCompress}(p);$ 
21 end

```

算法 3.2: 算法示例 2

参考文献

- [1] Knuth D E. Computers and Typesetting: A The T_E Xbook[M]. Reading, MA, USA: Addison-Wesley, 1986.

附录 A 论文规范

测试^[1]

致 谢

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在读期间发表的学术论文与取得的研究成果

已发表论文

1. A A A A A A A A A
2. A A A A A A A A A
3. A A A A A A A A A

待发表论文

1. A A A A A A A A A
2. A A A A A A A A A
3. A A A A A A A A A

研究报告

1. A A A A A A A A A
2. A A A A A A A A A
3. A A A A A A A A A