LaTeX 入门简介

如何使用 LaTeX 排版

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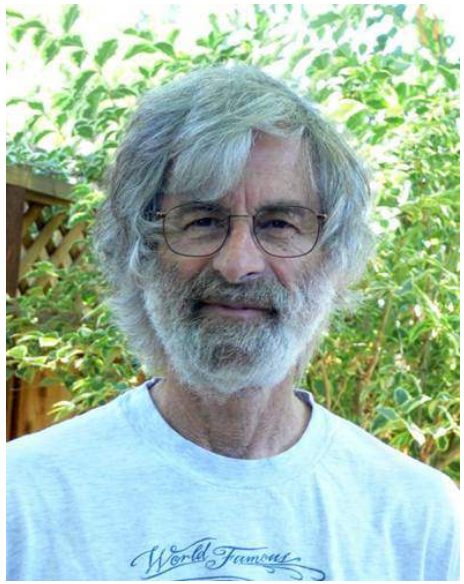
目录

目录

TEX 与 LATEX

1. TEX
   - 最初由 Donald E. Knuth 于 1978 年开发
   - 生成精美的图书排版系统
   - 漂亮、美观、稳定、通用
   - 尤其擅长数学公式的排版
   - 当前的版本号为 TEX3.14159265
2. LATEX
   - Leslie Lamport 开发 LATEX 降低使用门槛
   - 最流行和使用最为广泛的 TEX 宏集
   - 广泛用于学术界，期刊会议论文模板
   - 大学学位论文模板
   - CV、Poster



几个概念

套装发行版：是 TEX 排版引擎、支持排版的文件（基本格式、LATEX 宏包、字体等）以及一些辅助工具的集合。

- TEX Live：TUG 开发，跨平台，更新及时，值得信赖
- MikTEX：Windows 专享，宏包安装方便，值得信赖
- MacTEX：虽然我买不起苹果电脑，但是仍然值得信赖
- CTeX：不推荐，但是想用还是可以用的，开心就好。

编辑器：用什么东西写代码

- 专用免费编辑器：TeXworks、TeXStudio、TeXmaker
- 专用收费编辑器：WinEdt
- 通用文本编辑器：Vim、VS Code、Sublime、Atom
- 其他：Notepad

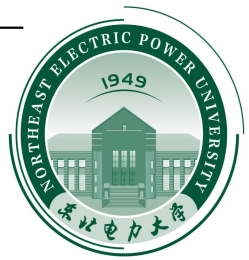
TEX 编译引擎

1. TEX(latex)：tex->dvi->pdf (需要其他工具)
2. pdfTEX(pdflatex)：tex->pdf (不支持 Unicode，西文首选)
3. LuaTEX(lualatex)：tex->pdf (支持 Unicode，但不稳定)
4. XETEX(xelatex)：tex->xdv->pdf (支持 Unicode，中文首选)
5. BIBTEX(bibtex)：输出参考文献

CTeX **套装发行版和** CTEX **宏包/文档类是两回事，请使用** CTEX **宏包配合** UTF-8 **编码进行中文排版！**

和 word 对比

Microsoft®word	LaTeX
文字处理工具	专业排版软件
容易上手，简单直观	学习成本高
所见即所得	所见即所想，所想即所得
高级功能不易掌握	进阶难，但一般用不到
需要花费大量时间调格式	专心内容，无需关系格式
公式排版差强人意	尤其擅长公式排版
各版本兼容性差	易读，稳定
商业付费	开源免费



LaTeX 排版举例: 数学公式

无编号公式

$$f(x) = f(x^{(0)}) + f'(x^{(0)})\Delta + \frac{1}{2}f''(x^{(0)})(\Delta x)^2 + \cdots$$

有编号公式

$$f(x) = \begin{cases} \dfrac{\cos x}{x + \sin x} & x \geq 0 \\ ax^2 + bx + c & x \leq 0 \end{cases} \tag{1}$$

$$\lim_{x \to 0} \frac{\sin x}{x} = 1 \tag{2}$$

LaTeX 排版举例: 数学公式

矩阵

$$A = \begin{bmatrix} \frac{\partial^2 f}{\partial x_1^2} & \frac{\partial^2 f}{\partial x_1 \partial x_2} & \cdots & \frac{\partial^2 f}{\partial x_1 \partial x_n} \\ \frac{\partial^2 f}{\partial x_2 \partial x_1} & \frac{\partial^2 f}{\partial x_2^2} & \cdots & \frac{\partial^2 f}{\partial x_2 \partial x_n} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{\partial^2 f}{\partial x_n \partial x_1} & \frac{\partial^2 f}{\partial x_n \partial x_2} & \cdots & \frac{\partial^2 f}{\partial x_n^2} \end{bmatrix}$$

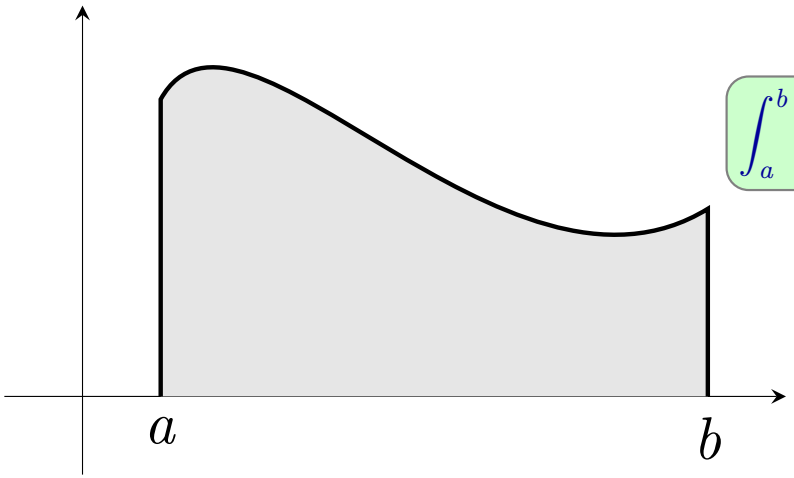
花体字

$\mathbb{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$

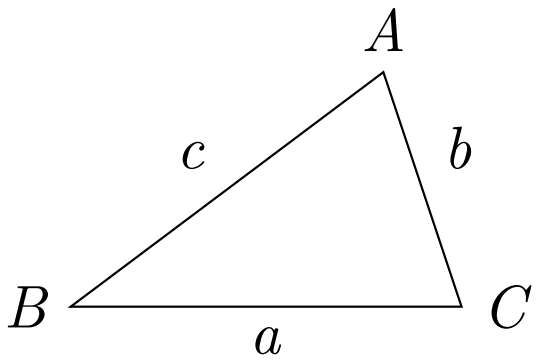
$\mathcal{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$

$\mathscr{ABCDEFGHIJKLMNOPQRSTUVWXYZ}$

LaTeX 排版举例: 图形排版



$$\int_a^b f(x)\,\mathrm{d}x = F(b) - F(a)$$



LaTeX 排版举例：算法

Algorithm 1 Least Squares Generative Adversarial Networks

Require: Learning rate α, Adam hyperparameters β_1,β_2, batch size m, parameters that control the number of iterations k.

Require: Initial weights θ_g for generator and θ_d for discriminator

while θ_d has not converged **do**

for k iterations **do**

- Sample batch noise samples $\{z\}_{i=1}^{m} \sim P_Z$.
- Sample batch samples $\{x\}_{i=1}^{m}$ from training set.
- Update parameters for discriminator network

$g_{\theta_d} \leftarrow \nabla_{\theta_d} \frac{1}{m} \sum_{i=1}^{m} [\frac{1}{2}(D(x^{(i)}) - 1)^2 + \frac{1}{2}(D(G(z^{(i)})))^2]$

$\theta_d \leftarrow \theta_d - \alpha \cdot Adam(\theta_d, g_{\theta_d}, \beta_1, \beta_2)$

end for

- Sample batch noise samples $\{z\}_{i=1}^{m} \sim P_Z$.
- Update parameters for generator network

$g_{\theta_g} \leftarrow \nabla_{\theta_g} \frac{1}{m} \sum_{i=1}^{m} \frac{1}{2}(D(G(z^{(i)})) - 1)^2$

$\theta_g \leftarrow \theta_g - \alpha \cdot Adam(\theta_g, g_{\theta_g}, \beta_1, \beta_2)$

end while

LaTeX 排版举例：文档

Publications by Björn W. Schuller

19 September 2019
Current h-index: **73** (source: Google Scholar)
Current citation count: **25 658** (source: Google Scholar)
(IF): Journal Impact Factor according to Journal Citation Reports, Thomson Reuters.
Acceptance rates of satellite workshops may be subsumed with the main conference.

A) Books

Books Authored (7):

1) S. Amiriparian, A. Bühlmeier, C. Henkelmann, M. Schmitt, B. Schuller, and O. Zeigermann, *Einstieg ins Machine Learning*. entwickler.press shortcuts, entwickkler.press/S&S Media Group, May 2019. 70 pages
2) B. W. Schuller, *I Know What You're Thinking: The Making of Emotional Machines*. Princeton University Press, 2018. to appear
3) A. Balahur-Dobrescu, M. Taboada, and B. W. Schuller, *Computational Methods for Affect Detection from Natural Language*. Computational Social Sciences, Springer, 2017. to appear
4) B. Schuller, *Intelligent Audio Analysis*. Signals and Communication Technology, Springer, 2013. 350 pages
5) B. Schuller and A. Batliner, *Computational Paralinguistics: Emotion, Affect and Personality in Speech and Language Processing*. Wiley, November 2013
6) K. Kroschel, G. Rigoll, and B. Schuller, *Statistische Informationstechnik*. Berlin/Heidelberg: Springer, 5th ed., 2011
7) B. Schuller, *Mensch, Maschine, Emotion – Erkennung aus sprachlicher und manueller Interaktion*. Saarbrücken: VDM Verlag Dr Müller, 2007. 239 pages

Books Edited (5):

8) H. N. Costin, B. W. Schuller, and A. M. Florea, eds., *Recent Advances in Intelligent Assistive Technologies: Paradigms and Applications*. Intelligent Systems Reference Library, Springer, 2019. to appear
9) S. Oviatt, B. Schuller, P. Cohen, D. Sonntag, G. Potamianos, and A. Krüger, eds., *The Handbook of Multimodal-Multisensor Interfaces Volume 3 – Multimodal Language Processing, Software Tools, Commercial Applications and Emerging Directions*. No. 23 in ACM Books, ACM Books, Morgan & Claypool, July 2019. 789 pages
10) S. Oviatt, B. Schuller, P. Cohen, D. Sonntag, G. Potamianos, and A. Krüger, eds., *The Handbook of Multimodal-Multisensor Interfaces Volume 2 – Signal Processing, Architectures, and Detection of Emotion and Cognition*. No. 21 in ACM Books, ACM Books, Morgan & Claypool, October 2018. 531 pages
11) S. Oviatt, B. Schuller, P. Cohen, D. Sonntag, G. Potamianos, and A. Krüger, eds., *The Handbook of Multimodal-Multisensor Interfaces Volume 1 – Foundations, User Modeling, and Common Modality Combinations*. No. 14 in ACM Books, ACM Books, Morgan & Claypool, June 2017. 661 pages
12) S. D'Mello, A. Graesser, B. Schuller, and J.-C. Martin, eds., *Proceedings of the 4th International HUMAINE Association Conference on Affective Computing and Intelligent Interaction 2011, ACII 2011*, vol. 6974/6975, Part 1 / Part II of *Lecture Notes on Computer Science (LNCS)*, (Memphis, TN), HUMAINE Association, Springer, October 2011

Contributions to Books (47):

13) S. Amiriparian, M. Schmitt, S. Ottl, M. Gerczuk, and B. Schuller, "Deep Unsupervised Representation Learning for Audio-based Medical Applications," in *Deep Learners and Deep Learner Descriptors for Medical Applications* (L. Nanni, S. Brahnam, S. Ghidoni, R. Brattin, and L. Jain, eds.), Intelligent Systems Reference Library (ISRL), Springer, 2019. 27 pages, invited contribution, to appear
14) S. Amiriparian, M. Schmitt, S. Hantke, V. Pandit, and B. Schuller, "Humans Inside: Cooperative Big Multimedia Data Mining," in *Innovations in Big Data Mining and Embedded Knowledge: Domestic and Social Context Challenges* (A. Esposito, A. M. Esposito, and L. C. Jain, eds.), vol. 159 of *Intelligent Systems Reference Library (ISRL)*, pp. 235–257, Springer, 2019. invited contribution
15) V. Karas and B. Schuller, "Enhancing Sentiment Analysis with Deep Learning: An Overview and Perspectives," in *Natural Language Processing for Global and Local Business* (F. Pinarbasi and M. N. Taskiran, eds.), IGI Global, 2019. to appear
16) V. Pandit, S. Amiriparian, M. Schmitt, K. Qian, J. Guo, S. Matsuoka, and B. Schuller, "Big Data Multimedia Mining: Feature Extraction facing Volume, Velocity, and Variety," in *Big Data Analytics for Large-Scale Multimedia Search* (S. Vrochidis, B. Huet, E. Y. Chang, and I. Kompatsiaris, eds.), ch. 3, pp. 61–83, Wiley, April 2019
17) M. Pateraki, K. Fysarakis, V. Sakkalis, G. Spanoudakis, I. Varlamis, S. Ioannidis, M. Maniadakis, M. Lourakis, N. Cummins, B. Schuller, E. Loutsetis, and D. Koutsouris, "Biosensors and Internet of Things in smart healthcare applications: challenges and opportunities," in *Wearable and Implantable Medical Devices* (N. Dey, A. Ashour, S. J. Fong, and C. Bhatt, eds.), vol. 7 of *Applications in ubiquitous sensing applications for healthcare*, ch. 2, pp. 25–53, Elsevier / Academic Press, 1 ed., 2019
18) P. Tzirakis, S. Zafeiriou, and B. Schuller, "Real-world automatic continuous affect recognition from audiovisual signals," in *Multi-modal Behavior Analysis in the Wild: Advances and Challenges* (X. Alameda-Pineda, E. Ricci, and N. Sebe, eds.), Computer Vision and Pattern Recognition, ch. 18, pp. 387–406, Elsevier, 2019
19) N. Cummins, J. Han, Z. Zhang, Z. Ren, and B. Schuller, "AI for Digital Health," in *Artificial Intelligence in Precision Health* (D. Barh, ed.), Elsevier, 2019. 10 pages, invited contribution, to appear
20) N. Cummins, F. Matcham, and B. Schuller, "Artificial Intelligence to aid the early detection of Mental Illness," in *Artificial Intelligence in Precision Health* (D. Barh, ed.), Elsevier, 2019. 10 pages, invited contribution, to appear
21) N. Cummins and B. Schuller, "Latest Advances in Computational Speech Analysis for Mobile Sensing," in *Mobile Sensing and Psychoinformatics* (H. Baumeister and C. Montag, eds.), Studies in Neuroscience, Psychology and Behavioral Economics, Berlin Heidelberg: Springer, 2019. 10 pages, invited contribution, to appear
22) M. Schmitt and B. Schuller, "Machine-based decoding of paralinguistic vocal features," in *The Oxford Handbook of Voice Perception* (S. Frühholz and P. Belin, eds.), ch. 43, pp. 719–742, Oxford University Press, 2019
23) D. Schuller and B. Schuller, "The Challenge of Automatic Eating Behaviour Analysis and Tracking," in *Recent Advances in Intelligent Assistive Technologies: Paradigms and Applications* (H. N. Costin, B. W. Schuller, and A. M. Florea, eds.), Intelligent Systems Reference Library, Springer, 2019. 30 pages, to appear
24) B. Schuller, "Multimodal User State and Trait Recognition: An Overview," in *The Handbook of Multimodal-Multisensor Interfaces Volume 2 – Signal Processing, Architectures, and Detection of Emotion and Cognition* (S. Oviatt, B. Schuller, P. Cohen, D. Sonntag, G. Potamianos, and A. Krüger, eds.), vol. 21 of *ACM Books*, ch. 5, pp. 131–165, ACM Books, Morgan & Claypool, 1 ed., October 2018
25) S. Bengio, L. Deng, L.-P. Morency, and B. Schuller, "Multidisciplinary Challenge Topic: Perspectives on Predictive Power of

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August 6, 2019

Name of Recipient
Department Name
Institute Name
Address

Dear sir/madam,

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent a nisi diam. Morbi consequat facilisis mi, sit amet laoreet velit aliquet quis. Sed a nisi vel augue ultricies blandit. Phasellus et congue dolor, at cursus dui. Integer quis faucibus metus. Vestibulum lobortis ligula in lectus pretium, in placerat lacus iaculis. Mauris nibh erat, condimentum at tortor at, sagittis viverra tortor. Vivamus posuere fermentum eros, rhoncus sagittis nisi imperdiet ac.

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Sincerely,

John Doe, PhD

encl: Attachment info

LaTeX 排版举例：文档

JOINT STRUCTURED GRAPH LEARNING AND UNSUPERVISED FEATURE SELECTION

Yong Peng, Leijie Zhang, Wanzeng Kong, Feiping Nie and Andrzej Cichocki
yongpeng@hdu.edu.cn

Abstract

The central task in graph-based unsupervised feature selection (GUFS) depends on two folds, one is to accurately characterize the geometrical structure of the original feature space with a graph and the other is to make the selected features well preserve such intrinsic structure. Currently, most of the existing GUFS methods use a two-stage strategy which constructs graph first and then perform feature selection on this fixed graph. Since the performance of feature selection severely depends on the quality of graph, the selection results will be unsatisfactory if the given graph is of low-quality. To this end, we propose a joint graph learning and unsupervised feature selection (JGUFS) model in which the graph can be adjusted to adapt the feature selection process. The JGUFS objective function is optimized by an efficient iterative algorithm whose convergence and complexity are analyzed in detail. Experimental results on representative benchmark data sets demonstrate the improved performance of JGUFS in comparison with state-of-the-art methods and therefore we conclude that it is promising of allowing the feature selection process to change the data graph.

Model Formulation

$$\min_{\mathbf{S},\mathbf{W},\mathbf{F}} \|\mathbf{S}-\mathbf{A}\|_F^2 + \alpha \mathbf{Tr}(\mathbf{F}^T\mathbf{L_s}\mathbf{F}) + \beta(\|(\mathbf{X}\mathbf{W}-\mathbf{F}\|_F^2 + \gamma\|\mathbf{W}\|_{2,1}) \quad (1)$$
$$s.t.\ \mathbf{S1}=\mathbf{1}, \mathbf{S}\geq\mathbf{0}, \mathbf{F}^T\mathbf{F}=\mathbf{I}_c, \mathbf{F}\geq\mathbf{0}$$

where $\mathbf{X}\in\mathbb{R}^{n\times d}$ is the data matrix, $\mathbf{W}\in\mathbb{R}^{d\times c}$ is the projection matrix, β and γ are regularization parameters. Similar to [1, 2], we impose the non-negativity on F here

Conclusion

In this paper, we proposed a novel GUFS method, termed JGUFS, which simultaneously performs graph construction and feature selection. Instead of performing feature selection on a fixed graph, JGUFS successfully avoided the disadvantages caused by the two-stage strategy. In JGUFS, the subobjectives respectively corresponding to graph construction and unsupervised feature selection could co-evolve towards the optimum. An efficient iterative optimization method with convergence guarantee was presented to optimize the JGUFS objective. Extensive experiments were conducted on representative data sets to demonstrate the excellent performance of JGUFS in comparison with state-of-the-art methods.

References

[1] Zhigang Ma Zi Huang Yi Yang, Heng Tao Shen and Xiaofang Zhou. L21-norm regularized discriminative feature selection for unsupervised learning. In *International Joint Conference on Artificial Intelligence*, pages 1589–1594, 2011.

[2] Jing Liu Xiaofang Zhou Zechao Li, Yi Yang and Hanqing Lu. Unsupervised feature selection using nonnegative spectral analysis. In *AAAI Conference on Artificial Intelligence*, pages 1026–1032, 2012.

Performance in Feature Selection

Table 1: Comparison of of clustering for different feature selection methods (ACC/NMI±std).

ACC	JAFFE	UMIST	USPS	MNIST	COIL20	WebKB	ISOLET
All-Fea	72.1±3.3	42.9±2.8	63.7±4.1	51.8±4.7	61.7±2.4	55.9±3.1	57.4±3.9
MaxVar	76.3±2.9	46.7±2.4	64.9±3.1	53.0±2.9	61.1±2.8	54.8±2.3	56.9±2.7
LapScore	77.2±3.2	45.8±3.0	64.1±3.2	53.9±3.5	62.1±2.1	56.1±2.8	56.8±2.9
MCFS	79.5±2.7	46.7±3.1	65.1±4.7	55.9±3.7	60.9±2.3	61.5±2.3	60.9±2.5
FSSL	85.6±2.2	51.9±3.3	66.5±2.4	57.1±3.8	62.5±2.8	62.3±2.7	64.9±3.1
UDFS	84.7±2.3	48.9±3.8	66.3±3.0	56.7±3.2	60.8±2.7	61.9±2.9	64.7±3.6
NDFS	86.9±2.5	51.1±3.7	66.9±2.7	58.5±2.8	63.3±2.1	62.5±3.0	65.1±3.9
JELSR	86.5±2.3	53.7±3.2	67.8±2.9	58.1±3.1	64.8±1.9	61.8±2.9	63.7±2.8
JGUFS	88.3±2.4	57.8±2.6	69.7±2.8	59.3±3.0	68.9±1.6	63.8±2.7	66.8±3.2

NMI	JAFFE	UMIST	USPS	MNIST	COIL20	WebKB	ISOLET
All-Fea	78.9±2.1	63.5±2.2	59.7±1.8	46.3±2.1	73.5±2.8	11.7±4.2	73.9±1.7
MaxVar	80.3±2.0	65.1±2.0	60.9±1.5	47.9±2.3	71.8±3.1	16.9±2.1	73.7±1.8
LapScore	81.9±1.8	64.7±2.6	60.3±1.3	48.3±2.0	73.9±2.9	13.4±3.5	72.1±1.1
MCFS	82.3±1.8	65.6±1.8	61.7±1.5	50.3±1.7	74.8±2.3	18.3±3.7	74.9±1.6
FSSL	88.6±1.3	67.7±2.0	62.3±1.3	50.8±2.1	75.1±2.7	18.5±3.5	76.8±1.7
UDFS	85.3±2.0	66.5±2.1	61.8±1.5	50.1±1.5	75.7±1.9	17.1±2.9	76.3±1.9
NDFS	87.6±1.9	68.9±2.5	61.3±1.1	51.6±1.1	77.3±1.8	17.6±2.7	78.4±1.2
JELSR	86.9±2.1	70.3±1.7	62.0±1.3	51.1±1.4	77.9±1.7	18.0±3.1	75.8±1.1
JGUFS	89.8±0.6	73.9±2.1	63.9±1.1	52.9±1.0	79.8±1.3	20.3±2.3	79.9±1.2

Optimization

With other two variables fixed, the following formula can be proved:

$$\mathcal{O}(\mathbf{F}^{t+1},\mathbf{W}^t\mathbf{S}^t) \leq \mathcal{O}(\mathbf{F}^t,\mathbf{W}^t\mathbf{S}^t),$$
$$\mathcal{O}(\mathbf{F}^{t+1},\mathbf{W}^{t+1}\mathbf{S}^t) \leq \mathcal{O}(\mathbf{F}^{t+1},\mathbf{W}^t\mathbf{S}^t)$$
$$\mathcal{O}(\mathbf{F}^{t+1},\mathbf{W}^{t+1}\mathbf{S}^{t+1}) \leq \mathcal{O}(\mathbf{F}^{t+1},\mathbf{W}^{t+1}\mathbf{S}^t)$$

We conclude that JGUFS objective function monotonically decreases under the optimization in Algorithm. 1.

Algorithm 1 Optimization to JGUFS objective function

Input: Data matrix $\mathbf{X}\in\mathbb{R}^{n\times d}$, λ, β, and γ, c, the dimension of projected subspace c;

Output: Rank features based on the values of $\|w_i\|_2\|_{i=1}^d$ in descending order and then select the top-ranked ones.

1: Initialization. Construct the initial graph affinity matrix $\mathbf{A}$ based on the 'HeatKernel' function; Calculate $\mathbf{F}\in\mathbb{R}^{n\times c}$ by the c eigenvectors of the graph Laplacian $\mathbf{L_A}=\mathbf{D_A}-\frac{\mathbf{A}^T+\mathbf{A}}{2}$ corresponding to the c smallest eigenvalues; Initialize $\mathbf{M}\in\mathbb{R}^{d\times d}$ as an identity matrix;;

2: **while** not converged **do**

3: Update $\mathbf{S}$ by solving:

$$\min_{s_i\mathbf{1}=1, s_i\geq 0} \|s_i-(a_i-\frac{\alpha}{2}d_i)\|_F^2,$$

where, $d_{ij}=\|f_i-f_j\|_2^2$ and d_i as a vector with the j-th element equal to d_{ij}. Similarly, we get a_i and s_i.

4: Update $\mathbf{W}$ by:

$$\mathbf{W}=(\mathbf{X}^T\mathbf{X}+\gamma\mathbf{M})^{-1}\mathbf{X}^T\mathbf{F}$$

5: Update $\mathbf{M}$ by:

$$m_{ii}=\frac{1}{2\|w\|_2}=\frac{1}{2\sqrt{w_iw_i^T+\delta}}$$

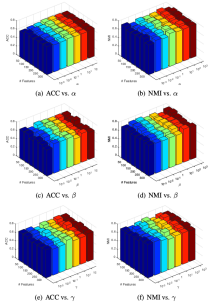
6: Update $\mathbf{F}$ by:

$$d_{ij}\leftarrow\frac{(\lambda\mathbf{F})_{ij}}{\mathbf{RF}+\lambda\mathbf{F}\mathbf{F}^T\mathbf{F}}$$

7: **end while**

Analysis

Figure 1 illustrates the clustering performance of JGUFS on COIL20 with different settings of parameters. From this figure, we find that JGUFS provides excellent performance when the parameters are set as different values in a wide range. Further, we can observe that even if a small number of features are selected, JGUFS can still achieve relatively good clustering results.



(a) ACC vs. α (b) NMI vs. α (c) ACC vs. β (d) NMI vs. β (e) ACC vs. γ (f) NMI vs. γ

Figure 1: Performance of JGUFS algorithm for large variation of set of control parameters.

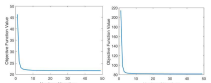
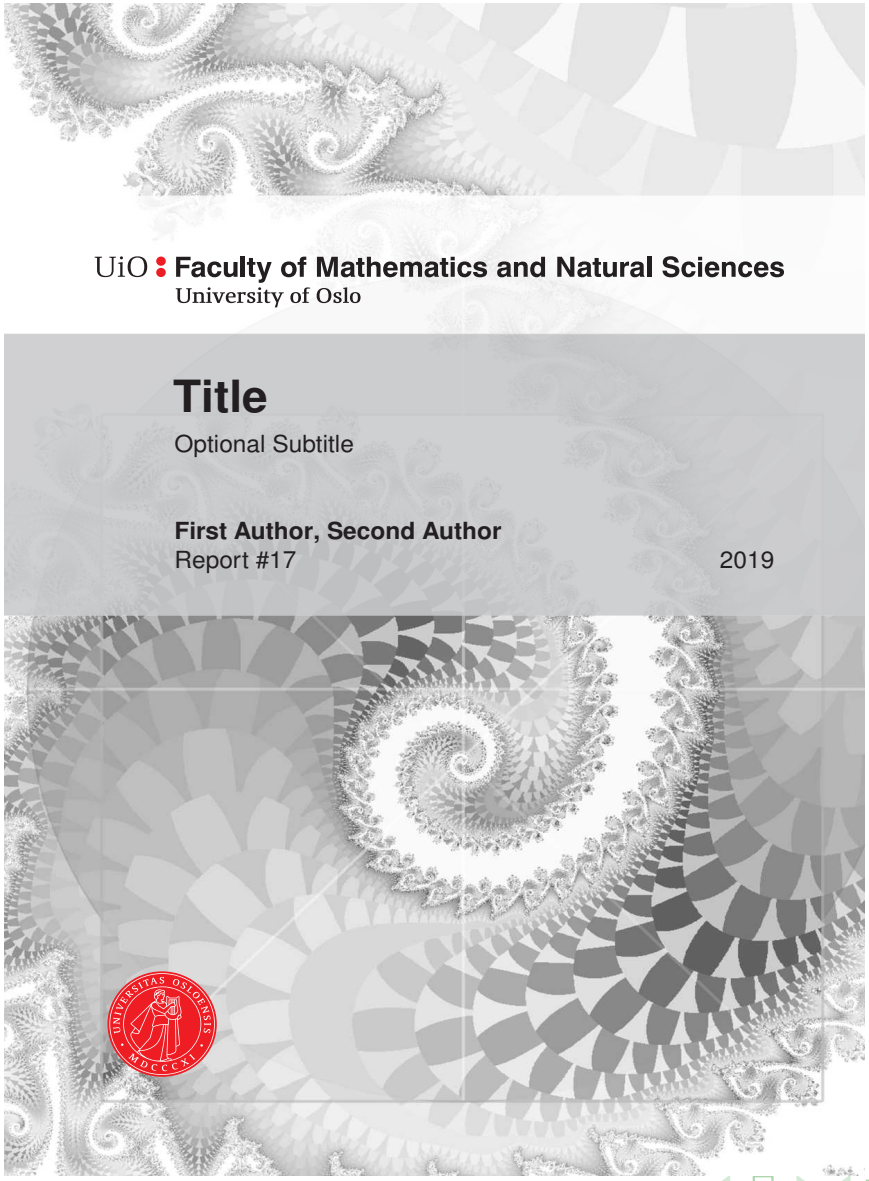


Figure 2: Convergence speed of JGUFS for UMIST and COIL20 data sets.

Figure 2 shows the convergence curves of the JGUFS objective function in terms of the number of iterations on UMIST and COIL20 from which we can observe that JGUFS has a relatively fast convergence speed.

LaTeX 排版举例：文档



LaTeX 排版举例：幻灯片

How to Get Rid of Ghosts

Mathematics Conference for the Mysterious and Magical

Ann B. Dextrous

April 1, 2020

Tsinghua Beamer Theme

Single Fermion

Tsinghua University

January 13, 2014

目录

基本结构

```
%% 导言区
\documentclass[11pt,utf8]{article} %report,book,beamer
\usepackage{ctex}  % 中文支持宏包
\title{一篇不太简短的\LaTeXe 简介}
\author{Tobias Oetiker}
\date{\today}

%% 正文区
\begin{document}
\maketitle % 自动生成标题页
这里是正文
\end{document}
```

宏包与环境

在使用 LaTeX 时，时常需要依赖一些扩展来增强或补充 LaTeX 的功能，比如排版复杂的表格、插入图片、增加颜色甚至超链接等等。这些扩展称为宏包。

```
\usepackage{package}
```

LaTeX 还引入了环境的用法，用以令一些效果在局部生效，或是生成特殊的文档元素。

```
\begin{<environment name>}{<arguments>}
. . .
\end{<environment name>}
```

LaTeX 命令

1. 简单命令：\命令
   - {\songti 东北电力大学} → 东北电力大学
   - \zihao{2} 电气工程学院 → 电气工程学院
   - \Large\textbf{我最帅} → **我最帅**
2. 环境
   - 无序列表环境 \begin{itemize} ... \end{itemize}
   - 有序列表环境 \begin{enumerate} ... \end{enumerate}

LaTeX 命令

1. 简单命令：\命令
   - {\songti 东北电力大学} → 东北电力大学
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   - 有序列表环境 \begin{enumerate} ... \end{enumerate}

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   - 无序列表环境 \begin{itemize} ... \end{itemize}
   - 有序列表环境 \begin{enumerate} ... \end{enumerate}

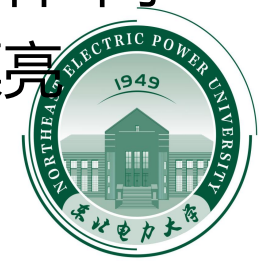
LaTeX 环境命令举例

```
\begin{itemize}
\item 第一
\item 第二
\item 第三
\end{itemize}
```

- 第一
- 第二
- 第三

```
\begin{enumerate}
\item 绝对不意气用事
\item 绝对不漏判任何一件坏事
\item 绝对裁判的公正漂亮
\end{enumerate}
```

1. 绝对不意气用事
2. 绝对不漏判任何一件坏事
3. 绝对裁判的公正漂亮



LaTeX 环境命令举例

常用命令

\chapter 章	\section 节	\maketitle 生成标题页	\tableofcontents 生成目录
\newpage 新的一页	\makebox 生成盒子	\vskip 垂直距离	\caption 标题
\label 标号	\ref 引用图表公式等	\includegraphics 插入图片	\cite 引用参考文献

文章结构

```
\usepackage{ctex}
\tableofcontents % 生成目录
\chapter{有监督学习}
\section{分类}
\subsection{逻辑回归}
\section{回归}
\subsection{线性回归}
```

第一章　有监督学习

第一节　分类

§1.1.1　逻辑回归

第二节　回归

§1.2.1　线性回归

交叉引用和脚注

```
% 给对象命名：图片、表格、公式
\label{key}
% 引用对象
\ref{label}
\pageref{label}
```

从第 8 页的公式 1 中我们可以看出

```
\footnote{text}
```

这里有一个可爱的脚注[1]

[1] 我在这里

交叉引用和脚注

```
东电图标请参见图~\ref{fig:logo}
\begin{figure}[htbp]
\centering
\includegraphics[scale=0.08]%
{figure/neepu_logo}
\caption{东北电力大学图标}
\label{fig:logo}
\end{figure}
```

东电图标请参见图 1

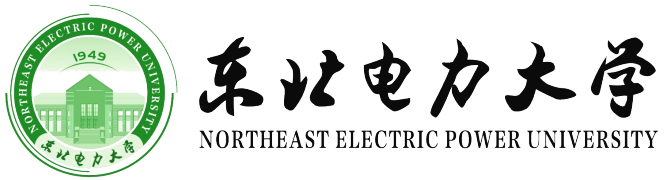


图 1: 东北电力大学图标

参考文献

LaTeX 提供了\cite 命令用于引用参考文献:

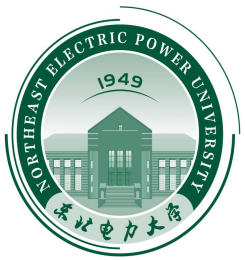
```
\cite{<citation>}
```

- 推荐使用 BibTeX 样式
  - 参考文献自动管理
  - bib 文件
  - bst 参考文献样式

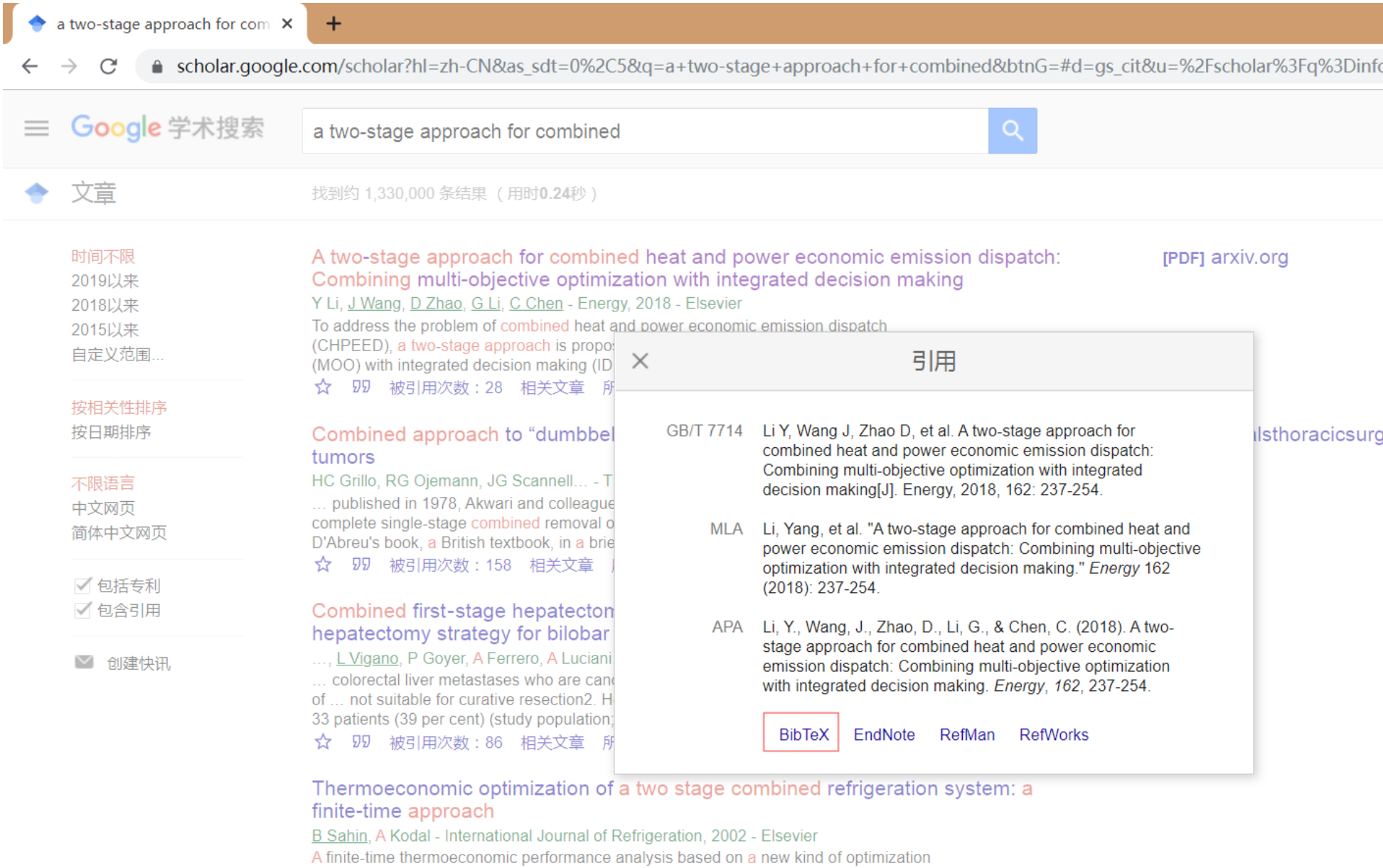
```
在许多文献\cite{li2018two,
        li2018optimal}中
```

如“在许多文献[1,2] 中”

```
@article{li2018two,
title={A two-stage approach for
combined heat and power economic
emission dispatch: Combining
multi-objective optimization with
integrated decision making},
author={Li, Yang and Wang, Jinlong
and Zhao, Dongbo and Li, Guoqing and
Chen, Chen},
journal={Energy},
volume={162},
pages={237–254},
year={2018},
publisher={Elsevier} }
```



参考文献


a two-stage approach for com
scholar.google.com/scholar?hl=zh-CN&as_sdt=0%2C5&q=a+two-stage+approach+for+combined&btnG=#d=gs_cit&u=%2Fscholar%3Fq%3Dinfo
Google 学术搜索
a two-stage approach for combined
文章
找到约 1,330,000 条结果（用时0.24秒）
时间不限
2019以来
2018以来
2015以来
自定义范围...
按相关性排序
按日期排序
不限语言
中文网页
简体中文网页
包括专利
包含引用
创建快讯
A two-stage approach for combined heat and power economic emission dispatch: Combining multi-objective optimization with integrated decision making
[PDF] arxiv.org
Y Li, J Wang, D Zhao, G Li, C Chen - Energy, 2018 - Elsevier
To address the problem of combined heat and power economic emission dispatch (CHPEED), a two-stage approach is propos (MOO) with integrated decision making (ID
被引用次数：28 相关文章
Combined approach to "dumbbel tumors
HC Grillo, RG Ojemann, JG Scannell... - T
... published in 1978, Akwari and colleague complete single-stage combined removal o D'Abreu's book, a British textbook, in a brie
被引用次数：158 相关文章
Combined first-stage hepatecton hepatectomy strategy for bilobar
..., L Vigano, P Goyer, A Ferrero, A Luciani
... colorectal liver metastases who are can of ... not suitable for curative resection2. H 33 patients (39 per cent) (study population;
被引用次数：86 相关文章
Thermoeconomic optimization of a two stage combined refrigeration system: a finite-time approach
B Sahin, A Kodal - International Journal of Refrigeration, 2002 - Elsevier
A finite-time thermoeconomic performance analysis based on a new kind of optimization
引用
GB/T 7714
Li Y, Wang J, Zhao D, et al. A two-stage approach for combined heat and power economic emission dispatch: Combining multi-objective optimization with integrated decision making[J]. Energy, 2018, 162: 237-254.
MLA
Li, Yang, et al. "A two-stage approach for combined heat and power economic emission dispatch: Combining multi-objective optimization with integrated decision making." Energy 162 (2018): 237-254.
APA
Li, Y., Wang, J., Zhao, D., Li, G., & Chen, C. (2018). A two-stage approach for combined heat and power economic emission dispatch: Combining multi-objective optimization with integrated decision making. Energy, 162, 237-254.
BibTeX
EndNote
RefMan
RefWorks

数学公式

数学公式排版是 LaTeX 的绝对强项，在 LaTeX 中排版数学公式需要进入数学模式

- 用两个 $ 美元符包围起来的是行内公式
- 用两个双美元符 $$ 包围起来的是行间公式
- 用 equation 环境包围的是带编号的公式
- 条件公式用 cases 环境，多行公式用 split、align、gather 环境等
- 运行 texdoc symbols 查看符号表

数学公式

```
在公式$V = \frac{4}{3}\pi r^2$中，有：
$$\lim_{n \rightarrow \infty}(1+\frac{1}{n})^n=e \quad
        V = \frac{4}{3}\pi r^2$$
这是一个极限n趋于无穷大的极限
```

在公式 $V = \frac{4}{3}\pi r^2$ 中，有：

$$\lim_{n \rightarrow \infty}(1+\frac{1}{n})^n = e \quad V = \frac{4}{3}\pi r^2$$

这是一个极限 n 趋于无穷大的极限

```
$D$ and $G$ play the following two-player minimax game
        with value function $V (G; D)$:
\begin{equation}
\min_{G}\max_{D}V(G,D)=\mathbb{E}_{x\sim P_{data}}[\log
         D(x)]+\mathbb{E}_{z \sim P_{z}}[\log(1-D(G(z))
        )]
\end{equation}
```

D and G play the following two-player minimax game with value function $V(G, D)$:

$$\min_G \max_D V(G, D) = \mathbb{E}_{x\sim P_{data}}[\log D(x)] + \mathbb{E}_{z\sim P_z}[\log(1 - D(G(z)))] \quad (3)$$

排版
模板的使用

- 模板
  - 已经设计好的格式框架
  - 不应将时间花费在调整框架上
- 哪里获取模板
  - 上网下载
  - .cls 文档类
  - .sty 宏包

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  - 上网下载
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  - .sty 宏包

IEEE LaTeXClass

```
\title{Optimal Scheduling of an Isolated Microgrid With Battery
       Storage Considering Load and Renewable Generation
       Uncertainties}
\author{Yang~Li,~\IEEEmembership{Member,~IEEE,}Zhen~Yang,Guoqing~Li,
       Dongbo~Zhao,~\IEEEmembership{Senior Member,~IEEE,} and Wei~
       Tian,~\IEEEmembership{Senior Member,~IEEE,}}
\maketitle
```

Optimal Scheduling of an Isolated Microgrid With Battery Storage Considering Load and Renewable Generation Uncertainties

Yang Li, *Member, IEEE,* Zhen Yang,Guoqing Li,Dongbo Zhao, *Senior Member, IEEE,* and Wei Tian, *Senior Member, IEEE,*

```
\begin{abstract}
abstract abstract abstract abstract abstract abstract abstract abstract abstract
\end{abstract}
\begin{IEEEkeywords}
deep learning, microgird
\end{IEEEkeywords}
\section{INTRODUCTION}
\subsection{Literature Review}
\subsection{Contribution of This Paper}
\subsection{Organization of This Paper}
\section{UNCERTAINTY MODELING OF MICROGRIDS}
\subsection{Probabilistic WT Model}
```

***Abstract*—abstract abstract abstract abstract abstract abstract abstract abstract**

***Index Terms*—deep learning, microgird**

I. INTRODUCTION

A. Literature Review

B. Contribution of This Paper

C. Organization of This Paper

II. UNCERTAINTY MODELING OF MICROGRIDS

A. Probabilistic WT Model

目录

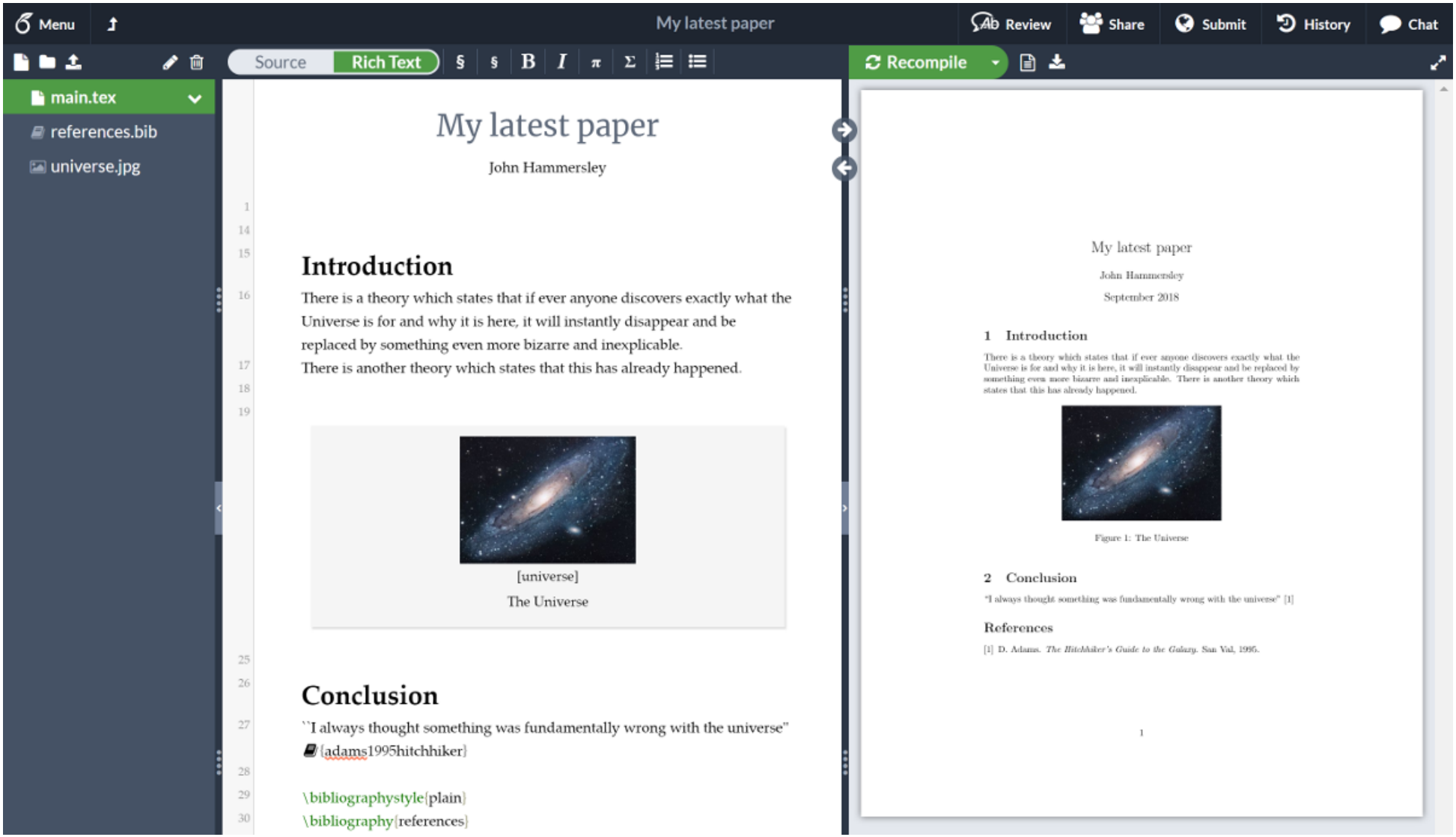
阅读材料

1. 仔细阅读《一份不太简短的 LaTeX 2_ε 介绍》(lshort-zh)
2. 仔细阅读 CTeX 宏集手册
3. 略读包太雷《LaTeXNotes(第二版)》
4. 《LaTeX 入门》(刘海洋)
5. 根据所需宏包查阅宏包手册
6. texdoc 例如：texdoc lshort-zh

LaTeX 网站

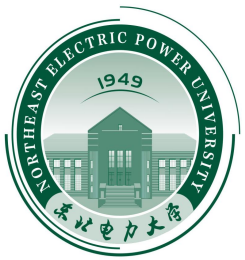
- Overleaf
- CTAN
- LaTeX 工作室
- TeX Live
- TeX Studio
- VS Code

LaTeX 网站


Menu
My latest paper
Review
Share
Submit
History
Chat
Source
Rich Text
Recompile
main.tex
references.bib
universe.jpg
My latest paper
John Hammersley
Introduction
There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable.
There is another theory which states that this has already happened.
[universe]
The Universe
Conclusion
``I always thought something was fundamentally wrong with the universe''
{adams1995hitchhiker}
\bibliographystyle{plain}
\bibliography{references}
My latest paper
John Hammersley
September 2018
1 Introduction
There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened.
Figure 1: The Universe
2 Conclusion
"I always thought something was fundamentally wrong with the universe" [1]
References
[1] D. Adams. The HitchHiker's Guide to the Galaxy. San Val, 1996.
1

一点点经验分享

1. 请远离 CJK 宏包与 CTeX 套装
   - CJK 是十年前处理中文的方式
   - CTeX 套装已经多年未更新，功能较为冗余
   - 处理中文，优先使用 CTEX 宏包或 xeCJK 宏包
2. 不要按 Word 的思路来学习/使用 LATEX
   - 常见误区：强制换行、更换字体、图文混排
   - ~~" 怎样在 LATEX 中实现 Word 中的 xx 功能"~~
   - 请逐渐习惯 LATEX 的思维方式
3. 切勿花费过多精力于 LATEX 的细枝末节上
   - TEX/LATEX 是进四十年前的发明，与现代程序设计原理有所冲突
   - 四十年来的层层累进，内容太多，不要指望能够马上学会
   - 文档的内容最重要
   - 写一点编译一次，提高容错；用好百度，Google



参考文献

[1] Yang Li, Jinlong Wang, Dongbo Zhao, Guoqing Li, and Chen Chen.
A two-stage approach for combined heat and power economic emission dispatch: Combining multi-objective optimization with integrated decision making.
Energy, 162:237–254, 2018.

[2] Yang Li, Zhen Yang, Guoqing Li, Dongbo Zhao, and Wei Tian.
Optimal scheduling of an isolated microgrid with battery storage considering load and renewable generation uncertainties.
IEEE Transactions on Industrial Electronics, 66(2):1565–1575, 2018.

- 本幻灯片源码：
  - https://github.com/Neiou8/neepu-latex-talk
  - 模板 https://github.com/Neiou8/neepu-slides
- 本幻灯片基于：
  - https://github.com/tuna/thulib-latex-talk
- 许可证：CC BY-SA 4.0 Unported

Thank you!