mcmthesis 文档类* → English Version

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摘要

这份模板是美国大学生数学建模竞赛（MCM/ICM）的论文模板。模板遵循赛事官方的要求，设置了页眉页脚、字体和控制页等内容。本文档对模板的使用做出了说明。

1 模板介绍

这份模板最早由王昭礼设计，并在往年参赛者的建议下不断改进。2014 年年初，黄晨成接手模板，用 key-value 语法重构了文档选项，并修复了一些 bug。2015 年年初，黄晨成将模板使用 DocStrip 的语法重构，并上传至 CTAN。

2 安装说明

2.1 下载

你可以到项目主页下载模板的最新版本，也可以关注 LaTeXStudio 的相关更新，除去项目主页之外，不再维护任何镜像。

    https://gitcafe.com/ChinaTeX/mcmthesis

此外，文档类也已上传至 CTAN，你可以在 TeX Live 等发行版的宏包管理器中下载。

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*这份文档是 mcmthesis v5.1.0a 的说明文档，更新日期 2015/01/19。

2.2 安装

我们以 SOURCE 代表你下载的源文件目录，在终端下执行以下命令。

```
cd SOURCE
xelatex mcmthesis.ins
xelatex -shell-escape mcmthesis.dtx
xelatex -shell-escape mcmthesis.dtx
xelatex mcmthesis-demo.tex
xelatex mcmthesis-demo.tex
```

你可以将生成的 mcmthesis.cls 拷贝至 TEXMF/tex/latex/mcmthesis/ 目录，将 mcmthesis.dtx 和 mcmthesis.ins 拷贝至 TEXMF/source/latex/mcmthesis/，将 mcmthesis.pdf、mcmthesis-demo.tex、mcmthesis-demo.pdf、figures/ 和 code/ 拷贝至 TEXMF/doc/latex/mcmthesis/，然后在终端执行 texhash；也可以将 mcmthesis.cls 放在当前目录直接使用。

生成的 mcmthesis-demo.tex 是一个示例文件，你可以参照这个文件来构建你的论文；也可以直接修改这个文件。

3　使用说明

3.1 依赖

mcmthesis 依赖于以下宏包，这些宏包在常见的 TeX 发行版中都已包含，在安装使用之前，请确认你的 TeX 发行版中正确安装了这些宏包。

kvoptions	etoolbox	fancyhdr	fancybox
ifthen	lastpage	listings	appendix
amsmath	amssymb	amsfonts	amsbsy
bm	mathrsfs	latexsym	paralist
longtable	multirow	hhline	tabularx
ctex	xeCJK	CJK	xCJK2uni
tabu	minted	longtable	hologo
array	flafter	pifont	calc
colortbl	booktabs	geometry	fontenc
berasans	hyperref	ifpdf	ifxetex
graphicx	epstopdf	bmpsize	xcolor
longtable	tabu	hologo	palatino

```
mwe
```

　　如果你尚未安装这些宏包，可以启动你的 TeX 发行版的宏包管理器来安装；或者到 `http://www.ctan.org` 上搜索下载并安装。

3.2　选项

　　mcmthesis 有三个选项：

tcn 队伍控制号码，接受一个字符串作为值；输入的值将显示在控制页上和每一页的页眉上；默认为 `0000`。

sheet 布尔值；为真时将输出控制页，否则不输出；默认为 `true`。

abstract 布尔值；为真时将在标题页输出摘要和关键词，否则不输出；默认值为 `true`。

　　注意，模板提供了 keywords 环境。该环境的内容只在标题页的摘要下输出，不会在控制页的摘要下输出。因此，若 `abstract = false`，则不会输出关键词。

3.3　题号

　　模板定义了 `\problem{⟨题号⟩}` 命令，用以选择题号。

3.4　编译方式

　　模板支持多种编译方式：

- X� LaTeX **这是推荐的方式**；

- pdfLaTeX；

- LaTeX + DVIPDFMx。

3.5　中文支持

　　由于 MCM/ICM 要求以英文写作，所以模板没有内建的中文支持。如果你在文章中需要使用个别中文字符，可以自行使用合适中文支持方式。

　　对于 X‑LaTeX 来说，可以使用 xeCJK 宏包。

```
\usepackage{xeCJK}
\setCJkmainfont{SimSun}
```

这里，Mac OS X 的用户可以使用 STSong 来代替 SimSun；Linux 用户则可以使用 FandolSong。

对于 pdfLaTeX 和 LaTeX + DVIPDFMx 来说，可以使用 zhmCJK 宏包。

```
\usepackage{zhmCJK}
\setCJkmainfont{SimSun.ttc}
```

对 Mac OS X 和 Linux 的说明同上。

The mcmthesis class* → 中文版

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2015/01/19

摘要

This template is designed for MCM/ICM. The template configured fonts, header and footer and control sheet style, accroding to the requirements of COMAP. This document desicribes the template.

4   Introduction

This template was designed by Zhaoli Wang first, and was improved by him following the suggestions from contest takers. In the beginning of the year 2014, Liam Huang redesigned it, by using key-value syntax, and fixed known bugs. Liam reimplemented it at the begining of the year 2015, by DocStrip, and uploaded it to CTAN.

5   Installation Guide

5.1   Download

You could find the latest version of this tamplate at the project homepage, as well as the websit LATEXStudio. We will not maintain any other mirror.

https://gitcafe.com/ChinaTeX/mcmthesis

Moreover, this template had been uploaded to CTAN, so that it could be managed by the package manager of your distribution, such as TEX Live.

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*This Document corresponds to mcmthesis v5.1.0a, dated 2015/01/19.

5.2   Installation

We denote SOURCE as the folder, who contains the file you've just down-loaded. Execute these command in the terminal.

```
cd SOURCE
xelatex mcmthesis.ins
xelatex -shell-escape mcmthesis.dtx
xelatex -shell-escape mcmthesis.dtx
xelatex mcmthesis-demo.tex
xelatex mcmthesis-demo.tex
```

To finish the installation, you could copy mcmthesis.cls to TEXMF/tex/latex/mcmthesis/, copy mcmthesis.dtx and mcmthesis.ins to TEXMF/source/latex/mcmthesis/, copy mcmthesis.pdf, mcmthesis-demo.tex, mcmthesis-demo.pdf, figures/ and code/ to TEXMF/doc/latex/mcmthesis/, and then run `texhash` in your terminal; you could also put mcmthesis.cls in the same folder of the master file.

mcmthesis-demo.tex is a generated demo file, you could write the manuscript of you paper by mimicing this file; you may also modify this file to build your paper.

6   Usage

6.1   Dependence

The mcmthesis class depends on the following pakcages. These packages has been installed in common TeX distribution. Before installation, please make sure that you have installed these packages correctly.

kvoptions	etoolbox	fancyhdr	fancybox
ifthen	lastpage	listings	appendix
amsmath	amssymb	amsfonts	amsbsy
bm	mathrsfs	latexsym	paralist
longtable	multirow	hhline	tabularx
ctex	xeCJK	CJK	xCJK2uni
tabu	minted	longtable	hologo
array	flafter	pifont	calc
colortbl	booktabs	geometry	fontenc

berasans	hyperref	ifpdf	ifxetex
graphicx	epstopdf	bmpsize	xcolor
longtable	tabu	hologo	palatino
mwe			

If you haven't install these packages, you could execute the package manager of your distribution and install them; you could also download them from `http://www.ctan.org`.

6.2   Options

mcmthesis has three options：

tcn The team control number, recieves a string as value; this value will be displayed on control sheet and every page's header. The default value is `0000`.

sheet Bool, true to print the control sheet, default is `true`.

abstract Bool, true to print the abstract on the titlepage, default is `true`.

Note that the template provides the keywords environment, whose contents will only be displayed after the abstract on titlepage, and will not be displayed on the control sheet. Thus, if one set `abstract = false`, keywords will not be printed.

6.3   Question

The template defines `\problem{`⟨*question*⟩`}` to choose the question.

6.4   Compilation Workflow

The template supports various kinds of compilation workflow:

- X$_{\text{E}}$L$^\text{A}$T$_\text{E}$X**recommend；**

- pdfL$^\text{A}$T$_\text{E}$X；

- L$^\text{A}$T$_\text{E}$X + DVIPDFMx。

7   The Implementation

7.1   Basic Information

1 ⟨∗class⟩

2 \NeedsTeXFormat{LaTeX2e}[1999/12/01]

3 \ProvidesClass{mcmthesis}

4   [2015/01/19 v5.1.0a Thesis Template For MCM/ICM]

5 \typeout{Thesis Template For MCM/ICM}

6 \def\MCMversion{v5.1.0a}

7.2   Options

Loading kvoptions and etoolbox to handle key-value options.

7 \RequirePackage{kvoptions}

8 \RequirePackage{etoolbox}

9 \SetupKeyvalOptions{family=MCM, prefix=MCM@opt@, setkeys=\kvsetkeys}

10 \newcommand{\skv}[1]{\kvsetkeys{MCM}{#1}}

Declaring options.

11 \DeclareBoolOption[true]{sheet}

12 \DeclareComplementaryOption{nosheet}{sheet}

13 \DeclareBoolOption[true]{abstract}

14 \DeclareComplementaryOption{noabstract}{abstract}

15 \DeclareStringOption[0000]{tcn}[0000]

16 \DeclareDefaultOption{\relax}

Processing options.

17 \ProcessKeyvalOptions*\relax

Loading document class.

18 \LoadClass[a4paper, 11pt]{article}

User interface.

19 \newcommand{\control}{\MCM@opt@tcn}

20 \newcommand{\team}{Team \#\ \MCM@opt@tcn}

7.3   Loading Packages

21 \RequirePackage{fancyhdr, fancybox}

22 \RequirePackage{ifthen}

23 \RequirePackage{lastpage}

```
24 \RequirePackage{listings}
25 \RequirePackage[toc, page, title, titletoc, header]{appendix}
26 \RequirePackage{paralist}
27 \RequirePackage{amsthm, amsfonts}
28 \RequirePackage{amsmath, bm}
29 \RequirePackage{amssymb, mathrsfs}
30 \RequirePackage{latexsym}
31 \RequirePackage{longtable, multirow, hhline, tabularx, array}
32 \RequirePackage{flafter}
33 \RequirePackage{pifont, calc}
34 \RequirePackage{colortbl, booktabs}
35 \RequirePackage{geometry}
36 \RequirePackage[T1]{fontenc}
37 \RequirePackage[scaled]{berasans}
38 \RequirePackage{hyperref}
39 \RequirePackage{ifpdf, ifxetex}
```

Loading graphicx and its relations after checking drivers.

```
40 \ifpdf
41   \RequirePackage{graphicx}
42   \RequirePackage{epstopdf}
43 \else
44   \ifxetex
45     \RequirePackage{graphicx}
46   \else
47     \RequirePackage[dvipdfmx]{graphicx}
48     \RequirePackage{bmpsize}
49   \fi
50 \fi
51 \RequirePackage{xcolor}
```

7.4 hyperref Settings

```
52 \ifpdf
53   \hypersetup{hidelinks}
54 \else
55   \ifxetex
56     \hypersetup{hidelinks}
57   \else
58     \hypersetup{dvipdfm, hidelinks}
```

```
59   \fi
60 \fi
```

7.5 Page Layout

Setting paper size and margin sep.

```
61 \geometry{a4paper, margin = 1.2in}
```

Making the footer and header.

```
62 \pagestyle{fancy}
63 \fancyhf{}
64 \lhead{\small \team}
65 \rhead{\small Page \thepage\ of \pageref{LastPage}}
```

Setting \parskip.

```
66 \setlength\parskip{.5\baselineskip}
```

7.6 Redefining TOC

```
67 \renewcommand\tableofcontents{%
68     \centerline{\normalfont\Large\bfseries\contentsname
69       \@mkboth{%
70           \MakeUppercase\contentsname}{\MakeUppercase\contentsname}}%
71     \vskip 5ex%
72     \@starttoc{toc}%
73     }
```

7.7 Mastering Floats, Figures and Tables

Setting counters. Here totalnumber is the maximum number of floats on a text page, topnumber is the maximum number of floats at top of a text page and bottomnumber is the maximum number of floats at bottom of a text page. Obviously, we have totalnumber = topnumber + bottomnumber.

```
74 \setcounter{totalnumber}{4}
75 \setcounter{topnumber}{2}
76 \setcounter{bottomnumber}{2}
```

Setting float fractions.

```
77 \renewcommand{\textfraction}{0.15}
78 \renewcommand{\topfraction}{0.85}
79 \renewcommand{\bottomfraction}{0.65}
80 \renewcommand{\floatpagefraction}{0.60}
```

Setting caption names.

```
81 \renewcommand{\figurename}{Figure}
82 \renewcommand{\tablename}{Table}
```

Setting graphic paths.

```
83 \graphicspath{{./}{./img/}{./fig/}{./image/}{./figure/}{./picture/}
84              {./imgs/}{./figs/}{./images/}{./figures/}{./pictures/}}
```

7.8 Designing Sheets and their Relations

Redefining `\@maketitle`, which is executed by `\maketitle`. `\@maketitle` will check if the control sheet and abstract (on title page) should be printed.

Note that the keywords will only be printed on the titlepage.

```
85 \def\@maketitle{%
86   \ifMCM@opt@sheet%
87   \makesheet%
88   \fi
89   \newpage
90   \null
91   \vskip 2em%
92   \begin{center}%
93   \let \footnote \thanks
94     {\LARGE \@title \par}%
95     \vskip 1.5em%
96     {\large
97       \lineskip .5em%
98       \begin{tabular}[t]{c}%
99         \@author
100       \end{tabular}\par}%
101     \vskip 1em%
102     {\large \@date}%
103   \end{center}%
104   \par
105   \vskip 1.5em%
106   \ifMCM@opt@abstract%
107   \make@abstract%
108   \fi%
109 }
```

Making the abstract environment.

```
110 \def\keywordsname{{\bfseries Keywords:}}
111 \def\@abstract{}%
112 \newbox\@abstract%
113 \setbox\@abstract\hbox{}%
114 \long\def\abstract{\bgroup\global\setbox\@abstract%
115   \vbox\bgroup\hsize\textwidth\leftskip1cm\rightskip1cm}%
116 \def\endabstract{\egroup\egroup}
117 \newbox\@keywords
118 \setbox\@keywords\hbox{}
119 \def\keywords{\bgroup\global\setbox\@keywords\vbox\bgroup\noindent\leftskip0cm}
120 \def\endkeywords{\egroup\egroup}%
121 \def\make@abstract{%
122 \par%
123 \centerline{\bfseries\abstractname}\vskip5pt\par%
124 \noindent\usebox\@abstract\par%
125 \noindent\hskip1cm\keywordsname\ \usebox\@keywords%
126 \vskip10pt%
127 }
```

Defining the \makesheet.

```
128 \newcommand{\@problem}[1]{}
129 \newcommand{\problem}[1]{\gdef\@problem{#1}}
130 \def\makesheet{%
131   \null%
132   \vskip 3em%
133   \begingroup\fontfamily{fvs}\fontseries{m}\selectfont%
134   \thispagestyle{empty}%
135   \noindent\begin{tabularx}{0.3\textwidth}{lX}%
136   \multicolumn{2}{l}{For office use only}\\
137     T1&\rule{3cm}{0.5pt}\\
138     T2&\rule{3cm}{0.5pt}\\
139     T3&\rule{3cm}{0.5pt}\\
140     T4&\rule{3cm}{0.5pt}\\
141     \end{tabularx}\hspace{\fill}
142     \begin{minipage}{0.33\textwidth}
143     \centering
144     Team Control Number\\[10pt]
145     {\fontsize{38pt}{25pt}\selectfont  \textbf{\MCM@opt@tcn} }%
```

146 `    \normalsize\\[10pt]`

147 `  Problem Chosen\\[10pt]`

148 ` {\fontsize{20pt}{\baselineskip}\selectfont \textbf{\@problem}}\normalsize\\`

149 `  \end{minipage}\hspace{\fill}`

150 `  \begin{tabularx}{0.28\textwidth}{lX}%`

151 `  \multicolumn{2}{l}{For office use only}\\`

152 `  F1&\rule{3cm}{0.5pt}\\`

153 `  F2&\rule{3cm}{0.5pt}\\`

154 `  F3&\rule{3cm}{0.5pt}\\`

155 `  F4&\rule{3cm}{0.5pt}\\`

156 `  \end{tabularx}\par`

157 `\noindent\rule{\textwidth}{0.5pt}\par`

158 `\begin{center}`

159 ` \textbf{\the\year\ Mathematical Contest in Modeling (MCM) Summary Sheet}\\`

160 `(Attach a copy of this page to each copy of your solution paper.)`

161 `\end{center}`

162 `\par%`

163 `\vskip 1.5em%`

164 `\centerline{\large\bfseries\abstractname}`

165 `\noindent\usebox\@abstract%`

166 `\endgroup}`

7.9   Mathematics

Theorems.

167 `\newtheorem{Theorem}{Theorem}[section]`

168 `\newtheorem{Lemma}[Theorem]{Lemma}`

169 `\newtheorem{Corollary}[Theorem]{Corollary}`

170 `\newtheorem{Proposition}[Theorem]{Proposition}`

171 `\newtheorem{Definition}[Theorem]{Definition}`

172 `\newtheorem{Example}[Theorem]{Example}`

Other definitions.

173 `\providecommand{\dif}{\mathop{}\!\mathrm{d}}`

174 `\providecommand{\me}{\mathrm{e}}`

175 `\providecommand{\mi}{\mathrm{i}}`

7.10   Listing Settings

```
176 \definecolor{grey}{rgb}{0.8,0.8,0.8}
177 \definecolor{darkgreen}{rgb}{0,0.3,0}
178 \definecolor{darkblue}{rgb}{0,0,0.3}
179 \def\lstbasicfont{\fontfamily{pcr}\selectfont\footnotesize}
180 \lstset{%
181 % indexing
182    % numbers=left,
183    % numberstyle=\small,%
184 % character display
185     showstringspaces=false,
186     showspaces=false,%
187     tabsize=4,%
188 % style
189     frame=lines,%
190     basicstyle={\footnotesize\lstbasicfont},%
191     keywordstyle=\color{darkblue}\bfseries,%
192     identifierstyle=,%
193     commentstyle=\color{darkgreen},%\itshape,%
194     stringstyle=\color{black}%
195 }
196 \lstloadlanguages{C,C++,Java,Matlab,Mathematica}
197 ⟨/class⟩
198 ⟨class⟩\endinput
```