The LiteSolution Template

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This is the document for LiteSolution template, which provides a lite design of the solution of test paper.

Some designs of this template currently only support **Simplified Chinese (Mainland)**. If necessary, you can change some Chinese characters to the language you want in the `*.cls` file.

1. Introduction

1.1 The purpose of this template

This template provides a lite and fresh template, and mainly used for typesetting solutions of mid-term or final exam, textbooks and other exercises. This template is developed based on ElegantBook and VividBooK, ported and improved the chapter design module code of The Legrand Orange Book. I'd like to express my gratitude to the template authors above for their previous work.

If you meet bugs when using this template, or you have better suggestions or ideas, or you want to participate in the development of the template or other templates by me, welcome to contact via email xiamyphys@gmail.com.

Also, you can join my LaTeX Template Discussion QQ Group: 760570712 to communicate with me and get the insider preview edition of the template.

1.2 Loading LiteSolution and its modes

You should update all the packages to the latest version or switch to portable version instead by implementing the commands

```
tlmgr update --self --all --reinstall-forcibly-removed
```

To learn more, please refer to How do I update my TEX distribution?

Save the file `litesolution.cls` to your project's root directory, and then create a `.tex` file, just input the command `\documentclass{litesolution}` on the first line.

The template provides 3 modes, answer, mtpro2 and counter. Just add the options of the modes you want separately in the square bracket of the command `\documentclass[options]{litesolution}` in your `.tex` file.

2. Modes of LiteSolution

2.1 The answer mode

This mode has two options, ans and noans, which can show and hide answers respectively. After you choose the noans, the contents in the environment solution, the command ans and the answers in the multiple choice questions will all disappear. So the area that originally contained the answer will be replaced by an area of the same blank size. You can generate exams without answers and solutions by enabling noans.

2.2 The mtpro2 mode

If you've installed the Mathtime Pro 2 Lite font in your computer, then you can use this mode to change the math font.

2.3 The counter

This mode has two options, separate and continuous, which can make the page counter between chapters be remaked or continuous.The page numbers between each test question will be continuous when you use the continuous mode or the page number of each test question will start from 1 when you use the separate.

3. Commands of LiteSolution

3.1 The chapterimage command

```
\chapterimage{cover1.png}
```

This command can assign the title background image for each subsequent chapter.

3.2 The chapterfont command

```
\chapterfont{PingFang HK}        \chapterfont*{PingFang HK}
```

This command can assign the title font for each subsequent chapter, if you do not use this command, the title font will be songti in Chinese and Libertinus in English.

If a star (*) is added after the `\chapterfont`, then TeXLive will call the font file from the current path, note from the system. And the file in the current path only support the `.ttf` format.

3.3 The ans command

This command can underlines the answer and changes the color of the answer to Blue Sapphire.

If mode noans is enabled, the answer will disappear, leaving only a horizontal line the same width as the answer.

3.4 The solute command

```
\solute{3} % create a solution box with the height of 3em.
```

This command can create a fixable solution box when the mode noans is enabled.

3.5 The watermark command

```
\watermark{ctanlion.pdf}
```

This command can add watermark to the document.

3.6 Other customer commands

In order to facilitate input, the following commands are scheduled. You can add others in the `*.cls` file as you like.

Command	Output	Command	Output	Command	Output
`\titlelogo{#1}{#2}`	Add emoji with link in text	`\point{#1}`	Add score	`\i`	i
`\sokka{#1}`	故本题选择 #1 项	`\d`	d	`\e`	e
`\xSim[#1]{#2}`	$\overset{r_2+r_1}{\sim}_{r_1\times 2}$	`\ee{#1}`	$\times 10^{-34}$	`\mat{#1}^\T`	$\mathbf{A}^{\mathsf{T}}$
`\rank{#1}`	$\mathrm{R}(\mathbf{AB})$	`\QED`	Q.E.D.	`$5\unit{kg}$`	5 kg

4. Environments of LiteSolution

4.1 The choice environment

There're two variables in this envrionment. The first one is the answer of the choice problem, the second one is the keywords of this choice problem and it's optional.

```
\begin{choice}{D}[Keywords]
If you want to add choice and keywords.
\begin{tasks}(2) % 2 choices per line
    \task This is choice A  \task This is
    choice B
    \task This is choice C  \task This is
    choice D
\end{tasks}
\end{choice}
```

题目 1 Keywords 【 D 】

If you want to add choice and keywords.

A. This is choice A B. This is choice B

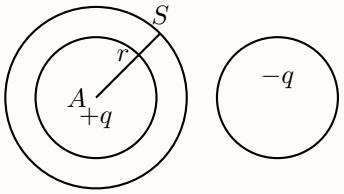
C. This is choice C D. This is choice D

题目 2 **Gaussian theory** 【 D 】

A 和 B 为两个均匀带电球体，A 带电荷 $+q$，B 带电荷 $-q$，作一与 A...

A. 通过 S 面的电场强度...　　B. 通过 S 面的电场强度...

C. 通过 S 面的电场强度...　　D. 通过 S 面的电场强度...




```
\begin{paracol}{2}
\begin{choice}{D}[Gaussian theory]
    $A$和$B$为两个均匀带电球体，$A$带电荷$+q$，$B$带电荷$-q$，作一与$A$...
    \begin{tasks}(2)
        \task 通过$S$面的电场强度...        \task 通过$S$面的电场强度...
        \task 通过$S$面的电场强度...        \task 通过$S$面的电场强度...
    \end{tasks}
\end{choice}
\switchcolumn\centering\vfill\tikz{...}\vfill
\end{paracol}
```

4.2 The problem environment

Sightly different from the cmdchoice environment: the two variables are points and keywords, and the question number counter is shared with the multiple-choice question number counter.

```
\begin{problem}[Keywords][5]
    If you want to add keywords and points.
\end{problem}
\begin{problem}
    If you want to add none.
\end{problem}
\begin{problem}[Keywords]
    If you want to add keywords only.
\end{problem}
\begin{problem}*[][5]
    If you want to add points only.
\end{problem}
```

题目 3（本题 5 分） **Keywords**

If you want to add keywords and points.

题目 4

If you want to add none.

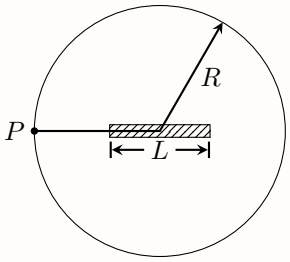
题目 5 **Keywords**

If you want to add keywords only.

题目 6（本题 5 分）

If you want to add points only.

题目 7（本题 6 分） **Gaussian theory & Field strength**



一均匀带电直导线长为 d，电荷线密度为 $+\lambda$. 过导线中点 O 作一半径为 R（$R > \frac{d}{2}$）的球面 S，P 为带电直导线的延长线与球面 S 的交点. 则通过该球面的电场强度通量 $\Phi_e = \underline{\frac{\lambda d}{\varepsilon_0}}$，带电直线的延长线与球面交点 P 处的电场强度的大小为 $\underline{\frac{\lambda d}{4\pi\varepsilon_0(R^2 - d^2/4)}}$，方向 $\underline{\text{沿矢径 } \overrightarrow{OP}}$.

```
\begin{paracol}{2}
    \begin{problem}[Gaussian theory \& Field strength][6]
        一均匀带电直导线长为$d$，电荷线密度为$+\lambda$，过导线中点$O$...
        场强大小\ans{$\frac{\lambda d}{4\pi\varepsilon_0(R^2-d^2/4)}$}...
    \end{problem}
\switchcolumn\centering\vfill\tikz{...}\vfill
\end{paracol}
```

4.3 The note environment

```
\begin{note}
    Please note that...
\end{note}
```

注意

Please note that...

4.4 The proof environment

```
\begin{proof}
    Due to \emph{Langrange's Thorem}...
\end{proof}
```

证明. Due to Langrange's Thorem... Q.E.D.

If a star (*) is added after the `\begin{solution}`, then the content will follow the

```
\begin{proof}*
    Due to \emph{Langrange's Thorem}...
\end{proof}
```

证明. Due to Langrange's Thorem...

4.5 The solution environment

```
\begin{solution}
    This is the answer for the problem.
\end{solution}
```

分析与解

This is the answer for the problem.

If a star (*) is added after the \begin{solution}, then the content will follow the

```
\begin{solution}*
    This is the answer for the problem.
\end{solution}
```

分析与解 This is the answer for the problem.

If mode noans is enabled, the solution will disappear, leaving only a blank box with the same height as the solution, and the name of the box will change to 答题区域.

5. Known Issues

TEXLive will return errors when you enable the mode noans and use the solution environment in paracol environment.

6. Version History

This template is used to type the mid-term and final exam solutions of College Physics. Initially, I used the ElegantBook template for layout, however, it's no longer be maintained since January 1st, 2023, so I turn to use the VividBooK instead. But this template is too bloated and some functions & designs need to be redesigned, so I started developing LiteSolution.

Version 0.1a was finished developing on 29 June, 2023 and released on WeChat Public Account: 物理问题作 with the name FreshSolution. This version redesigned the exercise environment and the solution environment in terms of designs and functions, and improvements have been made to the design of the chapterimage part.

Version 0.1b was finished developing on 6 July, 2023 and released on LaTeX Studio (Xiaoshan, Hangzhou) and Xiaohongshu, where won the favor of many people. This version has added the global option to make the page number be remaked or continuous between chapters, and command watermark has been added in this version.

Version 1.0a was finished developing on 15 November, 2023. This version has redesigned the chapterimage part, choice and replaced the exercise environment with the problem environment.

Version 1.2a was finished developing on 13 November, 2023. This version has integrated the chapter design of ElegantBook into the star (*) key value of this template chapter. And some commands friendly for matrices typesetting were added in. The command chapterfont was redesigned that it can call the font in the local path or call system font with(out) a star (*) after it. Also, the environment proof was redesigned, and the mode noans in this version supports hide the solution box and replace it with a fixable solution box. Today (2023/12/13) is The National public memorial day of Nanjing Massacre. Hope for world peace.

Update Announcements

2023/07/06 Update: Version 0.1b

- Support page number remaking between chapters.
- Added watermark command.

2023/11/15 Update: Version 1.0a

- Redesigned the chapterimage part, include the layout and the code.
- Redesigned the choice and solution environment, keywords become optional and supports star (*) key.
- Replaced the exercise environment with the problem environment, supports adding only keywords or points.
- Added the note environment and some customer commands.

2023/12/13 Update: Version 1.2a

- Fixed the bug that the gap around the chapter image.
- Added some commands for matrices.
- Redesigned the chapterfont command.
- Redesigned the proof environment.
- Supports to adjust the height of solution box when output the exam paper without answer.
- Add the 排版规范 in 中文（简体） after the package document.
- Fixed the bug that warnings of the packages xeCJK and fontspec.

Future Plans

- Plan to add the dark mode to this template to make the text color light while make the page color dark to protect eyesight.
- Plan to change the `*.cls` file to a block code design to make it easier for subsequent developers to maintain or modify.
- .....

LiteSolution 试卷解析模板排版规范

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1. 模板介绍

本模板用于高校期中 & 期末试卷排版，支持一键输出无答案试卷.

2. 数学公式

2.1 正体问题

1. 微分算符要使用正体：`\d`.
2. 自然对数要使用正体：`\e`.
3. 三角函数、exp 正体：`\function`
4. 撇`'`和`^\prime`的作用相同：TeX Stackexchange.

2.2 行内 & 行间公式

1. 行内公式：要`$ ... $`不要`\( ... \)`
2. 行间公式：要`\[ ... \]`不要`$$ ... $$`

至于为何，“不要”的命令在 LaTeX 中属于「脆弱」命令，这里不做详解.

LaTeX 中的「要」和「不要」- 知乎

2.3 选填题

1. 使用 tasks 环境判断高度

```
\begin{tasks}(一行选项个数，自己掂量)
 \task 选项1 \task 选项2
 \task 选项3 \task 选项4
\end{tasks}
```

不要使用`tabular`制作选择题选项，选项不是画表格!

2. 答案不要擅自使用`\underline{}`命令，而是使用`\ans{}`命令，否则制作空白无答案版时答案将无法隐藏.

2.4 等高括号

1. 凡是你觉得很高的都需做等高括号处理：`\ab( )`, `\ab[ ]`, `\ab\{ \}`
2. 但也不要所有括号都做等高处理，比如`f\ab(x)`和`f(x)`的效果是一样的，多一个`\ab`判断高度只会徒增编译时间.

3. 偷懒技巧

以`\frac{}{}`为例

1. `\frac12 == \frac{1}{2}, \frac\pi2 == \frac{\pi}{2}, \frac yx == \frac{y}{x}`
2. `frac{}{}`后跟两个键值，如果未使用`{}`界定作用域，则默认 scan 到第 1 个 char 或宏（如`\alpha`）时将其放入第一个键值，scan 到第 2 个 char 或宏（如`\alpha`）时将其放入第 2 个键值.
3. 不会用的话别乱用，老实儿使用`{}`界定作用域，不要出现诸如`\frac x'2`: $\frac{x}{'}2$（事实你要写的是 $\frac{x'}{2}$）.

4. 排版美观

1. 尽量不要（甚至杜绝）题目在上一页，答案在下一页的情况（**六级完形文章和题目不在一页的痛你应该经历过**）.
2. 杜绝出现题目/解答盒子断开跨页的情况，这很不美观. 如果一个题目解析实在过长，请尝试缩句，或者使用分栏`multicols`环境以节省空间.
3. 如果因第 $n+1$ 页开头的题目盒子高度小于第 n 页末尾剩余了空间而导致了空间浪费，请试着将后文中高度与第 n 页最后一道题目 + 剩余空间相当的题目位置与其交换.
4. 最完美的排版：除非遇到下一个`section`，每一页从头到尾都恰好填满了题目与解析.