



# The LiteSolution Class

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# 1

# Introduction to the **LiteSolution** Class

CHAPTER

## 1.1 Preface

This is the document for the **LiteSolution** class, which is designed for typesetting solutions of problems in exams, textbooks, etc.

Welcome to feedback bugs or ideas via email [xiamyphys@hdu.edu.cn](mailto:xiamyphys@hdu.edu.cn) or GitHub.

### 1.1.1 Installing **LiteSolution** and loading it

Simply download `litesolution.cls` file from GitHub or CTAN and save it under your working directory. However, I strongly suggest to use terminal to install and update all packages to the latest version

```
sudo tlmgr update --self --all
```

To learn more, please refer to [How do I update my T<sub>E</sub>X distribution?](#)

### 1.1.2 Compatibility

The test environments are macOS + MacT<sub>E</sub>X 2024 / Overleaf / Ubuntu 22.04.2 + T<sub>E</sub>X Live 2024 and they all work fine for pdfL<sub>A</sub>T<sub>E</sub>X and X<sub>Y</sub>L<sub>A</sub>T<sub>E</sub>X compilers. Windows and Unix platforms compatibility unknown.

## 1.2 Global Options of this Class

```
\documentclass[<options>]{litesolution}
```

### 1.2.1 The **answer** option

The `hideanswer` mode can hide contents in `solution` environment and `ans` command.

### 1.2.2 The **math** option

The `mtpro2`, `newtx` and `newtxsf` modes can format the font of formulas in the document. Please check if `mtpro2` font has been installed on your computer correctly before using `mtpro2` mode.

## 1.3 Related Packages

Package **notebeamer** provides macros for inputting slides on note papers quickly.

Package **fadingimage** provides macros for inputting full width picture at the edges of pages quickly.

# 2

# Settings & Usages of this Class

## CHAPTER

### 2.1 Cover Configurations

#### 2.1.1 The cover page configurations

```

\title{<content>}           \subtitle{<content>}
\bioinfo{<content>}        \cover[<pattern>]{<image>}
\coverhead[<angle>]{<image>} \coverhead* [<angle>]{<content>}

```

```

\begin{document}           \maketitle[<color>]

```

```

\title{\sffamily The \pkg{LiteSolution} Class}
\subtitle{\sffamily\scshape Hangzhou Dianzi University}
\bioinfo{Mingyu Hsia (\mailto{xiamyphys@hdu.edu.cn})
\quad\quad\today\quad\quad Version 2.2b}
\cover[checkerboard]{schrodinger} \coverhead[5]{universe}

```

```

\begin{document}           \maketitle[Midnightblue]

```

#### 2.1.2 The chapter head configurations

```

\chapterimage {<insert image macro>}

```

This command can assign the format of the image at every chapters begin and you can adjust the format of the image with the [fadingimage](#) package.

### 2.2 Preset Packages

This template has preset many packages. The following packages are the common ones

amsthm	amssymb	bm	booktabs	cancel	caption	circuitikz	datetime
derivative	diagbox	esvect	extrarrows	fadingimage	fancyhdr	fixdif	fontawesome5
geometry	graphics	graphicx	hyperref	indentfirst	lipsum	mathtools	multicol
multirow	nicematrix	notebeamer	paracol	pgfplots	physics2	qrcode	refstyle
setspace	siunitx	tabularx	tasks	wallpaper	xcolor	xeCJK	xfrac

## 2.3 Preset Commands

### 2.3.1 The `ans` command

```
\ans {<contents>}
```

This command can underline the answer, and if mode `noans` is enabled the answer will be hidden.

### 2.3.2 The `solute` command

```
\solute {<number>}           \solute* {<contents>}
```

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

### 2.3.3 Other preset commands

```
\def\i{\mathrm i}           \def\e{\mathrm e}           \def\T{\mathsf T}
\let\leq\leqslant           \let\geq\geqslant           \let\vec\vv
```

## 2.4 Preset `amsthm` Environments

### 2.4.1 The `problem` environment

```
\begin{problem}[<Keywords>]\leavevmode
\begin{tasks}(2)
  \task Choice A \task[\true] Choice B
  \task Choice C \task Choice D
\end{tasks}
\end{problem}
```

☑ **PROBLEM 2.1** (<Keywords>).

- |             |             |
|-------------|-------------|
| A. Choice A | ☑ Choice B  |
| C. Choice C | D. Choice D |

### 2.4.2 The `solution` and `note` environment

```
\begin{solution}
  B is correct.
\end{solution}
```

☑ **SOLUTION.** B is correct.

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

ⓘ **NOTE.** We note that.

## 2.5 Equation test

$$\begin{cases} i\hbar \partial_t \psi(\mathbf{x}, t) = \left(-\frac{\hbar^2}{2m} \nabla^2 + V\right) \psi(\mathbf{x}, t) \\ i\hbar \partial_t \psi(\mathbf{x}, t) = -(i\hbar c \boldsymbol{\alpha} \cdot \nabla + \beta mc^2) \psi(\mathbf{x}, t) \end{cases}$$

## Original Code for the Cover Head

```

\documentclass[svgnames,tikz]{standalone}

\usepackage{xcolor}
\usepackage{newtxtext,mtpro2, cancel, physics2, xfrac}
\usephysicsmodule{ab.legacy}
\usetikzlibrary{tikzmark}
\tikzset{every node/.style={align=center,DarkSlateGray!30},
  every path/.style={DarkSlateGray!30,line cap=round}}

\begin{document}\tikz{
  \node [above right] at (0,0) {$\color{DarkSlateGray!30}
    \tikzmarknode a{\Psi}=\displaystyle\tikzmarknode b{\int}
    \tikzmarknode c{\mathrm e}^{\frac{\tikzmarknode d{\mathrm i}}{\tikzmarknode e{\hbar}}
    \int a b(\frac{\tikzmarknode fR}{16\pi \tikzmarknode gG}-\frac{14\tikzmarknode hF^2}{\overline{\psi}\mathrm i\tikzmarknode{i}}{\cancel{D}}\psi-\tikzmarknode j{\lambda}
    \tikzmarknode k{\varphi\overline{\psi}}\psi
    +\abs{D\tikzmarknode l{\varphi}}^2-V(\varphi))}$};
  \draw ([yshift=-1ex] a.south) coordinate (A) ---+ (0,-.5)
  node [scale=.45,below] {Schr"odinger\\footnotesize wave function};
  \draw ([yshift=1ex] b.north) coordinate (B) ---+ (0,.55)
  node [scale=.45,above] {\footnotesize path integral\Feynmann};
  \draw ([yshift=-1ex] c.south) coordinate (C) ---+ (0,-.7)
  node [scale=.45,below] {Euler\\footnotesize exponential};
  \draw ([yshift=1ex] d.north) coordinate (D) ---+ (0,.45)
  node [scale=.45,above,xshift=1ex] {\footnotesize imaginary unit};
  \draw ([yshift=-1ex] e.south) coordinate (E) ---+ (0,-.5)
  node [scale=.45,below,xshift=2ex] {Planck\\footnotesize quantum};
  \draw ([yshift=1ex] f.north) coordinate (F) ---+ (0,.7)
  node [scale=.45,above] {\footnotesize spacetime-relativity\Einstein};
  \draw ([yshift=-1ex] g.south) coordinate (G) ---+ (0,-.5)
  node [scale=.45,below] {Newton\\footnotesize gravitation};
  \draw ([yshift=1ex] h.north) coordinate (H) ---+ (0,.5)
  node [scale=.45,above,xshift=5ex] {\footnotesize strong/weak/e.m. interactions\\
    Maxwell Yang-Mills};
  \draw ([yshift=-1ex] i.south) coordinate (I) ---+ (0,-.6)
  node [scale=.45,below] {Dirac\\footnotesize relativistic wave function};
  \draw ([yshift=-1ex] j.south) coordinate (J) ---+ (0,-.2)
  node [scale=.45,below,xshift=3ex] {Kobayashi-Maskawa\\footnotesize CKM matrix};
  \draw ([yshift=1ex] k.north) coordinate (K) ---+ (0,.5)
  node [scale=.45,above] {\footnotesize $\varphi$ - $\psi$ interaction\Yukawa};
  \draw ([yshift=-1ex] l.south) coordinate (L) ---+ (0,-.3)
  node [scale=.45,below] {Higgs\\footnotesize Boson};
  \foreach \x in {A,B,...,L}\fill [DarkSlateGray!30] (\x) circle (.025);}
\end{document}

```