

# Demo of My L<sup>A</sup>T<sub>E</sub>X Style

Hassium

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## 1 Packages

This style contains the following packages:

```
\usepackage[T1]{fontenc}
\usepackage[explicit]{titlesec}
\usepackage[utf8]{inputenc}
\usepackage{amsmath,amsthm,amssymb,amsfonts,mathrsfs,mathtools,nicematrix,chngecntr,
centernot,ytableau,sansmath,tikz-cd,pgfplots,tikz-3dplot}
\usepackage{imakeidx,textcomp,tocloft,environ,setspace,geometry,enumerate,enumitem,
blindtext,multicol,xcolor,fancyhdr,calligra,graphicx,etoolbox,wrapfig,mdframed,
tabularx,lipsum,comment,csquotes,verbatim,transparent,scalerel,ragged2e,
halloweenmath,manfnt,relsize,nameref}
\usepackage[hidelinks]{hyperref}
\usepackage{chemfig}
```

How to insert it?

```
\documentclass{article}
\input{hassium.tex}
```

## 2 Title Page Setup

After inserting the package, you should define the title and author name. Here is an example, which is the code of this demo:

```
\documentclass{article}
\input{hassium.tex}
\begin{document}
\def\htitle{Demo of Hassium Style}
\def\hauthor{Hassium}
\def\hfauthor{Hassium}
```

```

\hsetup
\htoc
\hmain
\end{document}

```

The command “hsetup” gives you the title and the author name. The command “htoc” gives a table of contents, which we will mention later. The command “hmain” is a setup of the mainmatter, which includes a fancy header. The “hfauthor” variable is the left part of the header. Also, feel free to use “hstart” command to include all three of them.

```

\documentclass{article}
\input{hassium.tex}
\begin{document}
\def\htitle{Demo of Hassium Style}
\def\hauthor{Hassium}
\def\hfauthor{Hassium}
\hstart
\end{document}

```

### 3 Page Geometry

There are some commands that adjust the geometry of the document:

```

\geometry{letterpaper,top=60pt,bottom=60pt,left=60pt,right=60pt,headheight=12pt,
headsep=10pt}
\setstretch{1.25}

```

### 4 More on Table of Contents

You can add descriptions to each section and the description will appear in the table of contents, directly below the section name:

```

\section{This is a Sample Section}
\descr{This is a description to the section}

```

The table of contents only shows the section names, but no subsections and numberless sections. If you want a numberless section in the table of contents, use the “newsection” command:

```

\newsection{This is a numberless section}

```

Note that the section names in the table of contents are hyperlinks; click on any section name to navigate directly to that section. You can do the converse to navigate to the first page as well.

### 5 Index Page

This style has a customized index page. Check the code:

```

This is a \hdef{defintiion}. This is another \hdef{vocabulary}.
\hindex

```

The command “hdef” mark the word and print it. The command “hindex” is a customized index page that print words in three columns. Each page number in the index page contains a hyperlink to that page.

## 6 Darkmode

Darkmode commands change the background color to black and the text to white. Similar to the normal setup, there are darkmode setup:

```
\darkhsetup
\darkhtoc
\darkhmain
```

## 7 Other Environments and Commands

The line-spacing in “`enumerate`” environment is changed:

```
\setlist[enumerate]{topsep=0pt,itemsep=-1ex,partopsep=1ex,parsep=1ex}
```

The “`level`” environment is used in “`enumerate`” environment, consider the following code:

```
\begin{enumerate}
  \item This is the first line.
  \begin{level}
    \item This is the second line.
    \begin{level}
      \item This is the third line.
    \end{level}
  \end{level}
  \item This is another line.
\end{enumerate}
```

This code gives:

1. This is the first line.
2. This is the second line.
3. This is the third line.
4. This is another line.

The command “`circled`” draws a small circle and you can add something inside the circle:

```
\circled{1}
```

The output is ①. You can write any Roman numerals by:

```
\rom108
```

There are two simple commands for hand-written fonts:

```
\cfd{font 1}
\cfc{font 2}
```

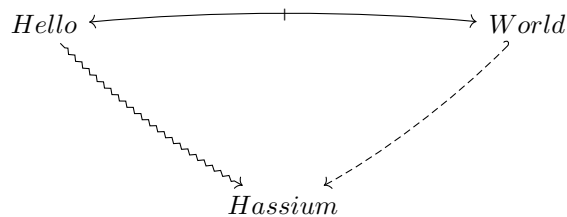
The outputs are *font 1* and *font 2*.

## 8 Quiver

Quiver is done by varkor and AndréC, check their github for more information. I include quiver to draw curve arrows in a commutative diagram. To draw a diagram with quiver, check this website. An example is given below:

```
\begin{center}
  \begin{tikzcd}
    Hello & \&\&\& World \\
    & \arrow["\shortmid"{marking}, curve={height=-6pt}, tail reversed, from=1-1, to=1-5] \\
    & \arrow[curve={height=6pt}, squiggly, from=1-1, to=4-3] \\
    & \arrow[curve={height=-6pt}, dashed, hook', from=1-5, to=4-3] \\
    & \&\& Hassium
  \end{tikzcd}
\end{center}
```

The diagram looks like:



## 9 Theorem Styles

Several theorem styles are offered:

```
\theoremstyle{definition}
\newtheorem{definition}{Definition}[section]
\newtheorem{theorem}{Theorem}[section]
\newtheorem*{proposition}{Proposition}
\newtheorem*{lemma}{Lemma}
\newtheorem*{corollary}{Corollary}
\newtheorem*{example}{Example}
\newtheorem*{remark}{Remark}
\newtheorem*{notation}{Notation}
\newtheorem{problem}{Problem}[section]
\newtheorem*{claim}{Claim}
```

The environment name can be customized by using:

```
\customtheorem{This is a custom theorem}
\begin{This is a custom theorem}
  The proof is trivial.
\end{This is a custom theorem}
```

The output will be:

**This is a custom theorem.** The proof is trivial.

If you don't want to include section number but still want to have a counter in a single section, please use:

```
\begin{adefinition}
  A definition in appendix.
\end{adefinition}
\begin{atheorem}
  A theorem in appendix.
\end{atheorem}
```

You can put any number or label in “exercise” environment:

```
\begin{exercise}[8.6]
  The proof is trivial.
\end{exercise}
```

The environment looks like:

**Exercise 8.6.** The proof is trivial.

## 10 Invisible Proofs

The environment “reviewmode” is originally done by my friend ETwilight. It replaces your “proof” environment by three empty lines:

```
\begin{reviewmode}
  \begin{proof}
    The proof is trivial.
  \end{proof}
\end{reviewmode}
```

## 11 Drawing Functions

The function drawing command is based on the package `pgfplots`, you may use the following code:

```
\functiondraw{3}{0.8}{-5}{5}{\exp(-x^2-y^2)*x}
\functiondraw{2}{0.8}{-5}{5}{\exp(x^-2*\sin(deg(x)))}
\functiondraw{3}{0.8}{-5}{5}{\sin(deg(sqrt(x^2+y^2)))/sqrt(x^2+y^2)}
```

The first parameter decides the dimension of the graph. If you want the graph to be 2D, then set 2 to the first parameter. Otherwise, give a random integer that does not equal to 2 would give you a 3D graph. The second parameter is the scale of your plot. The third and the fourth is the domain of the plot, in our example, the domain is  $[-5, 5]$ . The last entry is for your function. The example code (with centering) yields the following plot.



## 12 Simple Commands in Math Mode

I will give a table of all commands in math mode.

$\backslash ua$	$\uparrow$	$\backslash dom$	$\text{dom}$
$\backslash da$	$\downarrow$	$\backslash cod$	$\text{cod}$
$\backslash Ra$	$\Rightarrow$	$\backslash colim$	$\text{colim}$
$\backslash La$	$\Leftarrow$	$\backslash cat\{C\_S\}$	$C_S$
$\backslash Ua$	$\Uparrow$	$\backslash Cl$	$Cl$
$\backslash Da$	$\Downarrow$	$\backslash CAT$	$CAT$
$\backslash nRa$	$\nrightarrow$	$\backslash card\{1\}$	$ 1 $
$\backslash nLa$	$\nleftarrow$	$\backslash sq$	$\square$
$\backslash hra$	$\hookrightarrow$	$\backslash largediamond$	$\diamond$
$\backslash hla$	$\hookleftarrow$	$\backslash defa$	$:=$
$\backslash lt$	$\rightsquigarrow$	$\backslash pa$	$\partial$
$\backslash mt$	$\mapsto$	$\backslash d$	$d$
$\backslash rat$	$\rightharpoonup$	$\backslash Ext$	$\text{Ext}$
$\backslash lat$	$\leftarrow$	$\backslash Tor$	$\text{Tor}$
$\backslash thra$	$\rightarrow$	$\backslash fl\{1\}$	$[1]$
$\backslash thla$	$\leftarrow$	$\backslash al$	$\alpha$
$\backslash bij$	$\xrightarrow{\sim}$	$\backslash be$	$\beta$
$\backslash Ann$	$\text{Ann}$	$\backslash ga$	$\gamma$
$\backslash A\{1\}$	$A^1$	$\backslash de$	$\delta$
$\backslash ab$	$ab$	$\backslash ep$	$\epsilon$
$\backslash can$	$can$	$\backslash si$	$\sigma$
$\backslash Can$	$\text{Can}$	$\backslash la$	$\lambda$
$\backslash Rel$	$\text{Rel}$	$\backslash ka$	$\kappa$
$\backslash Cycl$	$\text{Cycl}$	$\backslash om$	$\omega$
$\backslash SCan$	$\text{SCan}$	$\backslash Ga$	$\Gamma$
$\backslash Cay$	$\text{Cay}$	$\backslash De$	$\Delta$
$\backslash bb\{H\}$	$\mathbb{H}$	$\backslash Si$	$\Sigma$
$\backslash ca\{H\}$	$\mathcal{H}$	$\backslash LA$	$\Lambda$
$\backslash fr\{H\}$	$\mathfrak{H}$	$\backslash Om$	$\Omega$
$\backslash scr\{H\}$	$\mathscr{H}$	$\backslash vt$	$\vartheta$
$\backslash comp$	$\circ$	$\backslash vp$	$\varphi$
$\backslash iso$	$\approx$	$\backslash ve$	$\varepsilon$
$\backslash niso$	$\not\approx$	$\backslash acts$	$\curvearrowright$
$\backslash Mor$	$\text{Mor}$	$\backslash Gal$	$\text{Gal}$
$\backslash Aut$	$\text{Aut}$	$\backslash cyc\{1\}$	$\langle 1 \rangle$
$\backslash End$	$\text{End}$	$\backslash Ht$	$ht$
$\backslash Hom$	$\text{Hom}$	$\backslash Hol$	$\text{Hol}$
$\backslash Inn$	$\text{Inn}$	$\backslash id$	$\text{id}$
$\backslash Out$	$\text{Out}$	$\backslash im$	$\text{im}$
$\backslash Iso$	$\text{Iso}$	$\backslash inv\{1\}$	$1^{-1}$
$\backslash Ob$	$\text{Ob}$	$x \backslash \text{mod } y$	$x \bmod y$

$\backslash\mathrm{norm}\{1\}$	$\ 1\ $	$\backslash\mathrm{supn}$	$\supsetneq$
$\backslash\mathrm{N}$	$\mathbb{N}$	$\backslash\mathrm{es}$	$\emptyset$
$\backslash\mathrm{C}$	$\mathbb{C}$	$\backslash\mathrm{sm}$	$\backslash$
$\backslash\mathrm{R}$	$\mathbb{R}$	$\backslash\mathrm{ps}$	$\mathcal{P}$
$\backslash\mathrm{Q}$	$\mathbb{Q}$	$\backslash\mathrm{Un}$	$\cup$
$\backslash\mathrm{Z}$	$\mathbb{Z}$	$\backslash\mathrm{In}$	$\cap$
$\backslash\mathrm{F}$	$\mathbb{F}$	$\backslash\mathrm{Du}$	$\sqcup$
$\backslash\mathrm{nsg}$	$\leq$	$\backslash\mathrm{Cp}$	$\coprod$
$\backslash\mathrm{ot}$	$\otimes$	$\backslash\mathrm{cp}$	$\amalg$
$\backslash\mathrm{op}$	$\oplus$	$\backslash\mathrm{sgn}$	$\mathrm{sgn}$
$\backslash\mathrm{Ps}\{1\}$	$\mathbb{P}^1$	$\backslash\mathrm{sdp}$	$\rtimes$
$\backslash\mathrm{CP}\{1\}$	$\mathbb{CP}^1$	$\backslash\mathrm{Spec}$	$\mathrm{Spec}$
$\backslash\mathrm{RP}\{1\}$	$\mathbb{RP}^1$	$\backslash\mathrm{Syl}$	$\mathrm{Syl}$
$\backslash\mathrm{proj}$	$\mathrm{proj}$	$\backslash\mathrm{Sym}$	$\mathrm{Sym}$
$\backslash\mathrm{po}$	$\prec$	$\backslash\mathrm{GL}$	$\mathrm{GL}$
$\backslash\mathrm{poe}$	$\preceq$	$\backslash\mathrm{SL}$	$\mathrm{SL}$
$\backslash\mathrm{ran}$	$\mathrm{ran}$	$\backslash\mathrm{Mod}$	$\mathrm{Mod}$
$\backslash\mathrm{sub}$	$\subset$	$\backslash\mathrm{Sg}$	$\mathfrak{S}$
$\backslash\mathrm{sube}$	$\subseteq$	$\backslash\mathrm{Ag}$	$\mathfrak{A}$
$\backslash\mathrm{sups}$	$\supset$	$\backslash\mathrm{uni}$	$\exists!$
$\backslash\mathrm{supe}$	$\supseteq$	$\backslash\mathrm{tp}\{1\}$	$1^\top$
$\backslash\mathrm{nsup}$	$\not\supseteq$	$\backslash\mathrm{T}$	$\mathcal{T}$
$\backslash\mathrm{nsup}$	$\not\supset$	$\backslash\mathrm{tri}$	$\triangle$
$\backslash\mathrm{nsube}$	$\not\subseteq$	$\backslash\mathrm{td}$	$\mathrm{tradg}$
$\backslash\mathrm{nsupe}$	$\not\supseteq$	$\backslash\mathrm{wb}\{1\}$	$\bar{\mathrm{I}}$
$\backslash\mathrm{subn}$	$\subsetneq$		

### 13 Acknowledgement

Special thanks to  $\mathcal{FSG}$ . His advice on this style has been invaluable.