

Demo of My L^AT_EX 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,chgcntr,
centernot,ytableau,sansmath,tikz-cd,pgfplots,tikz-3dplot}
\usepackage{imakeidx,textcomp,tocloft,envirom,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}
```

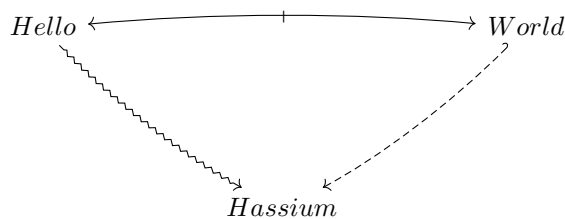
The outputs are *font 1* and *font 2*.

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] \\
    & \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:

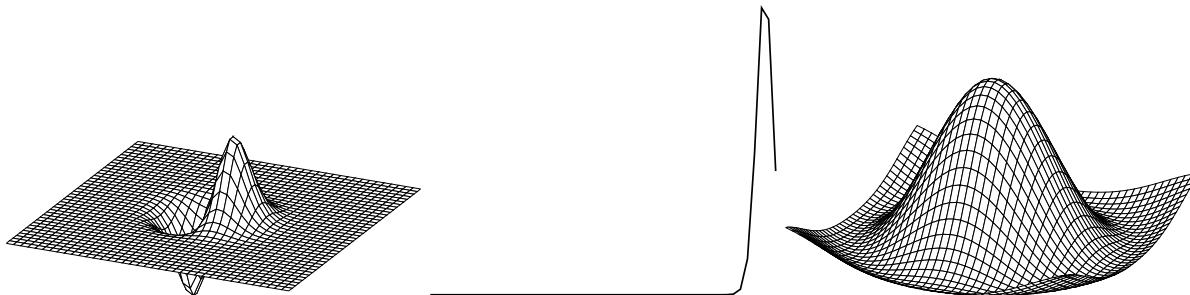
```
\begin{reviewmode}
  \begin{proof}
    The proof is trivial.
  \end{proof}
\end{reviewmode}
```

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	$\backslash dom$	dom
$\backslash da$	\downarrow	$\backslash cod$	cod
$\backslash Ra$	\Rightarrow	$\backslash colim$	$colim$
$\backslash La$	\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	$\beta dist$	$dist$
$\backslash hra$	\hookrightarrow	$\backslash sq$	\square
$\backslash hla$	\hookleftarrow	$\backslash largediamond$	\diamond
$\backslash lt$	\rightsquigarrow	$\backslash defa$	$:=$
$\backslash mt$	\mapsto	$\backslash pa$	∂
$\backslash rat$	\rightharpoonup	$\backslash d$	d
$\backslash lat$	\leftarrow	$\backslash Ext$	Ext
$\backslash thra$	\rightarrow	$\backslash Tor$	Tor
$\backslash thla$	\leftarrow	$\backslash fl\{1\}$	$[1]$
$\backslash bij$	$\xrightarrow{\sim}$	$\backslash al$	α
$\backslash Ann$	Ann	$\backslash be$	β
$\backslash A\{1\}$	A^1	$\backslash ga$	γ
$\backslash ab$	ab	$\backslash de$	δ
$\backslash can$	can	$\backslash ep$	ϵ
$\backslash Can$	Can	$\backslash si$	σ
$\backslash Rel$	Rel	$\backslash la$	λ
$\backslash Cycl$	$Cycl$	$\backslash ka$	κ
$\backslash SCan$	$SCan$	$\backslash om$	ω
$\backslash Cay$	Cay	$\backslash Ga$	Γ
$\backslash bb\{H\}$	\mathbb{H}	$\backslash De$	Δ
$\backslash ca\{H\}$	\mathcal{H}	$\backslash Si$	Σ
$\backslash fr\{H\}$	\mathfrak{H}	$\backslash LA$	Λ
$\backslash scr\{H\}$	\mathscr{H}	$\backslash Om$	Ω
$\backslash comp$	\circ	$\backslash vt$	ϑ
$\backslash iso$	\approx	$\backslash vp$	φ
$\backslash niso$	$\not\approx$	$\backslash ve$	ε
$\backslash Mor$	Mor	$\backslash acts$	\curvearrowright
$\backslash Aut$	Aut	$\backslash Gal$	Gal
$\backslash End$	End	$\backslash cyc\{1\}$	$\langle 1 \rangle$
$\backslash Hom$	Hom	$\backslash Ht$	ht
$\backslash Inn$	Inn	$\backslash Hol$	Hol
$\backslash Out$	Out	$\backslash id$	id
$\backslash Iso$	Iso	$\backslash im$	im
$\backslash Ob$	Ob	$\backslash inv\{1\}$	1^{-1}

$x \bmod y$	$x \bmod y$	$\backslash\mathrm{subn}$	\subsetneq
$\backslash\mathrm{norm}\{1\}$	$\ 1\ $	$\backslash\mathrm{supn}$	\supsetneq
$\backslash N$	\mathbb{N}	$\backslash\mathrm{es}$	\emptyset
$\backslash C$	\mathbb{C}	$\backslash\mathrm{sm}$	\backslash
$\backslash R$	\mathbb{R}	$\backslash\mathrm{ps}$	\mathcal{P}
$\backslash Q$	\mathbb{Q}	$\backslash\mathrm{Un}$	\bigcup
$\backslash Z$	\mathbb{Z}	$\backslash\mathrm{In}$	\bigcap
$\backslash F$	\mathbb{F}	$\backslash\mathrm{Du}$	\sqcup
$\backslash\mathrm{nsg}$	\trianglelefteq	$\backslash\mathrm{Cp}$	\coprod
$\backslash\mathrm{ot}$	\otimes	$\backslash\mathrm{cp}$	\amalg
$\backslash\mathrm{op}$	\oplus	$\backslash\mathrm{sgn}$	sgn
$\backslash\mathrm{Ps}\{1\}$	\mathbb{P}^1	$\backslash\mathrm{sdp}$	\rtimes
$\backslash\mathrm{CP}\{1\}$	\mathbb{CP}^1	$\backslash\mathrm{Spec}$	Spec
$\backslash\mathrm{RP}\{1\}$	\mathbb{RP}^1	$\backslash\mathrm{Syl}$	Syl
$\backslash\mathrm{proj}$	proj	$\backslash\mathrm{Sym}$	Sym
$\backslash\mathrm{po}$	\prec	$\backslash\mathrm{GL}$	GL
$\backslash\mathrm{poe}$	\preceq	$\backslash\mathrm{SL}$	SL
$\backslash\mathrm{ran}$	ran	$\backslash\mathrm{Mod}$	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
$\backslash\mathrm{nsb}$	$\not\subset$	$\backslash\mathrm{T}$	\mathcal{T}
$\backslash\mathrm{nsup}$	$\not\supset$	$\backslash\mathrm{tri}$	\triangle
$\backslash\mathrm{nsube}$	$\not\subseteq$	$\backslash\mathrm{td}$	tradg
$\backslash\mathrm{nsupe}$	$\not\supseteq$	$\backslash\mathrm{wb}\{1\}$	$\bar{\mathrm{I}}$

13 Acknowledgement

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