Demo of My LaTeX Style

Hassium

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,chngcntr,
    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}
        \item This is another line.
    \end{level}
\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 Romam numerals by:

```
\rom108
```

There are two simple commands for hand-written fonts:

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

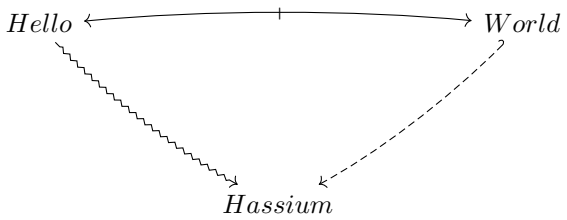
The outputs are *font 1* and *font 2*.

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 \\
        \\
        \\
        && Hassium
        \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:

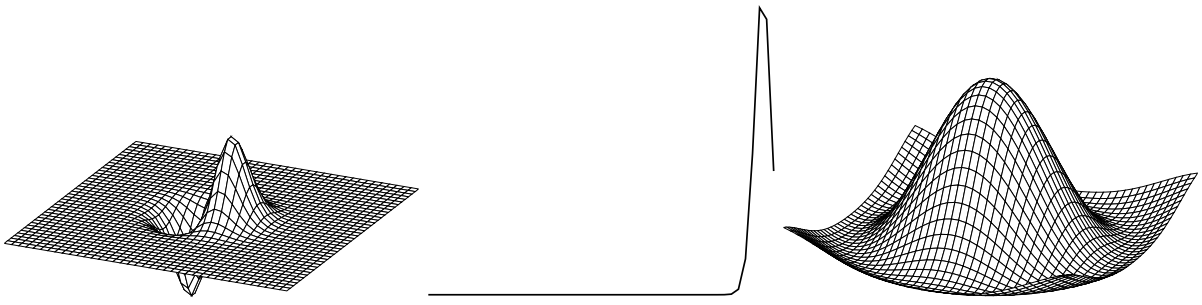
```
\begin{reviewmode}
    \begin{proof}
        The proof is trivial.
    \end{proof}
\end{reviewmode}
```

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.

\ua	$\uparrow$	\dom	dom
\da	$\downarrow$	\cod	cod
\Ra	$\Rightarrow$	\colim	colim
\La	$\Leftarrow$	\cat{C_S}	$\mathsf{C_S}$
\Ua	$\Uparrow$	\Cl	Cl
\Da	$\Downarrow$	\CAT	CAT
\nRa	$\nRightarrow$	\card{1}	$\lvert 1\rvert$
\nLa	$\nLeftarrow$	\sq	$\square$
\hra	$\hookrightarrow$	\largediamond	$\lozenge$
\hla	$\hookleftarrow$	\defa	$:=$
\lt	$\rightsquigarrow$	\pa	∂
\mt	$\mapsto$	\d	d
\rat	$\rightarrowtail$	\Ext	Ext
\lat	$\leftarrowtail$	\Tor	Tor
\thra	$\twoheadrightarrow$	\fl{1}	$\lfloor 1\rfloor$
\thla	$\twoheadleftarrow$	\al	α
\bij	$\xrightarrow{\sim}$	\be	β
\Ann	Ann	\ga	γ
\A{1}	$\mathbb{A}^1$	\de	δ
\ab	ab	\ep	ϵ
\can	can	\si	σ
\Can	Can	\la	λ
\Rel	Rel	\ka	κ
\Cycl	Cycl	\om	ω
\SCan	SCan	\Ga	Γ
\Cay	Cay	\De	Δ
\bb{H}	$\mathbb{H}$	\Si	Σ
\ca{H}	$\mathcal{H}$	\LA	Λ
\fr{H}	$\mathfrak{H}$	\Om	Ω
\scr{H}	$\mathscr{H}$	\vt	ϑ
\comp	$\circ$	\vp	φ
\iso	$\approx$	\ve	ε
\niso	$\not\approx$	\acts	$\curvearrowright$
\Mor	Mor	\Gal	Gal
\Aut	Aut	\cyc{1}	$\langle 1\rangle$
\End	End	\Ht	ht
\Hom	Hom	\Hol	Hol
\Inn	Inn	\id	id
\Out	Out	\im	im
\Iso	Iso	\inv{1}	1^{-1}
\Ob	Ob	x\mod y	$x \bmod y$

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

13 Acknowledgement

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