Demo of Hassium Style

Hassium

1 Packages and General Setup

This style contains the following packages:

```
\usepackage[T1]{fontenc}
\usepackage[hidelinks]{hyperref}
\usepackage[explicit]{titlesec}
\usepackage[utf8]{inputenc}
\usepackage{amsmath,amsthm,amssymb,amsfonts,mathrsfs,mathtools,nicematrix,chngcntr,
centernot,ytableau,tikz-cd}
\usepackage{textcomp,tocloft,environ,setspace,geometry,enumerate,enumitem,blindtext,
multicol,xcolor,fancyhdr,calligra,graphicx,wrapfig,pgfplots,mdframed,tabularx,lipsum,
comment,csquotes}
\usepackage{chemfig}
```

How to insert it?

```
\documentclass{article} % This style only has commands on \section
\input{hassium.tex} % Download and input it using its path
```

2 Title Page Setup

After inserting the package, you should define the title and author name as follows:

```
\begin{document}
    \def\htitle{Your Title} % replace ‘‘Your Title’’ with the title you want
    \def\hauthor{Your Name} % replace ‘‘Your Name’’ with the author name you want
    \hsetup % given the parameters, this should setup the title
\end{document}
```

You can setup the table of contents by the code:

```
\begin{document}
    \htoc
\end{document}
```

This will automatically generate a table of contents when you add a section to the document.

3 Mainmatter of the Document

Every page in the mainmatter has a header, which contains author name, title, and page number. Use the following code to setup:

```
\begin{document}
    \hmain
\end{document}
```

4 An Example: This Demo

This demo offers an easy example of how to use the style. Here is my code for this demo:

```
\documentclass[10pt]{article} % The font size does not matter
\input{hassium.tex}
\begin{document}
    \def\htitle{Demo of Hassium Style}
    \def\hauthor{Hassium}
    \hsetup\
    \htoc\
    \hmain\
\end{document}
```

5 Setup in Geometry

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

```
\geometry{letterpaper, margin=0.75in}
\setstretch{1.25} % spacing
\setlength{\headheight}{13pt}
```

6 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.

7 Darkmode

Darkmode command changes the background color to black and the text to white. The normal mode is used to end the darkmode. Use the commands by:

```
\begin{document}
    \darkmode
    \normalmode
\end{document}
```

8 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:

```
\rom2024 % replace 2024 by any number you want
```

There are two simple commands for hand-written fonts:

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

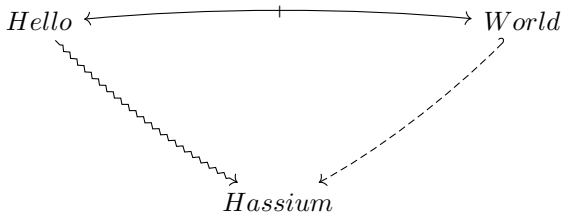
The outputs are font 1 *font 1* and *font 2*.

9 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:

```
% chktex-file 15 % the three lines enables useless warnings
% chktex-file 17
% chktex-file 18
\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:



10 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}
```

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{theorem}
```

The output environment is:

This is a custom theorem. The proof is trivial.

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.

11 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}
```

12 Simple Commands in Math Mode

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

\bs	$\backslash$	\de	δ
\N	$\mathbb{N}$	\ep	ϵ
\Z	$\mathbb{Z}$	\si	σ
\Q	$\mathbb{Q}$	\la	λ
\R	$\mathbb{R}$	\ka	κ
\C	$\mathbb{C}$	\om	ω
\bb{H}	$\mathbb{H}$	\vp	φ
\ca{H}	$\mathcal{H}$	\vt	ϑ
\fr{H}	$\mathfrak{H}$	\ve	ε
\T	$\mathcal{T}$	\ua	$\uparrow$
\Pn{1}	$\mathbb{P}^1$	\da	$\downarrow$
\CP{1}	$\mathbb{CP}^1$	\Ra	$\Rightarrow$
\RP{1}	$\mathbb{RP}^1$	\La	$\Leftarrow$
\Sym	Sym	\Ua	$\Uparrow$
\GL	GL	\Da	$\Downarrow$
\SL	SL	\nRa	$\nRightarrow$
\Mod	Mod	\nLa	$\nLeftarrow$
\Sg	$\mathfrak{S}$	\hra	$\hookrightarrow$
\Ag	$\mathfrak{A}$	\hla	$\hookleftarrow$
\Cay	Cay	\lt	$\rightsquigarrow$
\uni	$\exists\,!$	\mt	$\mapsto$
\al	α	\rat	$\rightarrowtail$
\be	β	\lat	$\leftarrowtail$
\ga	γ	\thra	$\twoheadrightarrow$

\thla	$\twoheadleftarrow$	\inv{f}	f^{-1}
\bij	$\xrightarrow{\sim}$	1\mod 2	1 mod 2
\wb{A}	$\overline{A}$	\Cl	Cl
\id	id	\Hol	Hol
\sub	$\subset$	\comp	$\circ$
\sube	$\subseteq$	\Gal	Gal
\supe	$\supseteq$	\card{S}	$\lvert S\rvert$
\nsub	$\not\subset$	\im	im
\nsup	$\not\supset$	\norm{M}	$\lVert M\rVert$
\nsube	$\not\subseteq$	\po	$\preceq$
\nsupe	$\not\supseteq$	\cyc{g}	$\langle g\rangle$
\subn	$\subsetneq$	\Spec	Spec
\supn	$\supsetneq$	\Syl	Syl
\es	$\varnothing$	\iso	$\approx$
\sm	$\setminus$	\niso	$\not\approx$
\ps	$\mathscr{P}$	\Mor	Mor
\Un	$\bigcup$	\Aut	Aut
\In	$\bigcap$	\End	End
\Du	$\bigsqcup$	\Hom	Hom
\cp	$\amalg$	\Inn	Inn
\Cp	$\coprod$	\Out	Out
\ot	$\otimes$	\Iso	Iso
\op	$\oplus$	\Ob	Ob
\acts	$\curvearrowright$	\cop{C}	C^{op}
\Span	span	\tri	$\triangle$
\sgn	sgn	\pa	∂
\nsg	$\trianglelefteq$	\hb	$\hbar$
\defa	$\coloneqq$	\Ann	Ann
\sdp	$\rtimes$		

13 Acknowledgement

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