Writing an academic article or lab report with tau LaTeX class

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Abstract—Welcome to tau (τ) LaTeX class for making academic articles and lab reports. In this example template, we will guide you through the process of using and customizing this class to your needs. For more information of this class check out the appendix section. There, you will find codes that define key aspects of the template, allowing you to explore and modify them.

Keywords—*LaTeX class, lab report, academic article, tau class*

Contents

1 Introduction 1

2 Document styling 1

2.1 Title . . . 1
2.2 Abstract . . . 1
2.3 Table of contents . . . 1
2.4 Tau start . . . 1
2.5 Caption . . . 1
Figures • Tables
2.6 Equation . . . 1

3 Environment 2

4 Adding codes 2

5 References 2

6 Appendix 2

6.1 Alternative title . . . 2
6.2 Equation skip value . . . 2
6.3 Environments . . . 2
Environments language • Note Info
6.4 References . . . 3

7 Contact me 3

References 3

1. Introduction

Welcome to *tau class* template for preparing your academic article or lab report. In this guide, we will take a look at its main features and how you can customize some aspects to this class. Due to its clean and structured code, users can easily customize this class to their specific needs and preferences. In addition, this template uses an easy-to-read and high quality font with *stix2*. Notable features include custom colors, environments and settings for including code from Matlab, C, C++ and LaTeX.

2. Document styling

2.1. Title

The `\maketitle` command generates the title and author information section, including the professor name or other information, and affiliations. The title can be modified in *tau class* code in the *title style* section.

By default, *tau class* shows the title on the left. However, you can change `\raggedright` to `\centering` in `\titlepos` to move the title to the center or, modify it to your own preferences.

2.2. Abstract

The abstract and keywords are defined using the `\keywords` and `\begin{abstract}␣\end{abstract}` commands respectively. For the abstract to appear, make sure the `\tauabstract` command is always included after the beginning of the document.

2.3. Table of contents

The *tau class* provides a table of contents. Each level of the ToC provides a preview of the content and its location in the document.

2.4. Tau start

We included the `\taustart{}` command, which provides a personalized lettrine for the beginning of a paragraph.

2.5. Caption

2.5.1. Figures

The `\captionsetup[figure]` command customizes the appearance of captions for figures in LaTeX documents. For example, Fig. 1 shows an example figure.

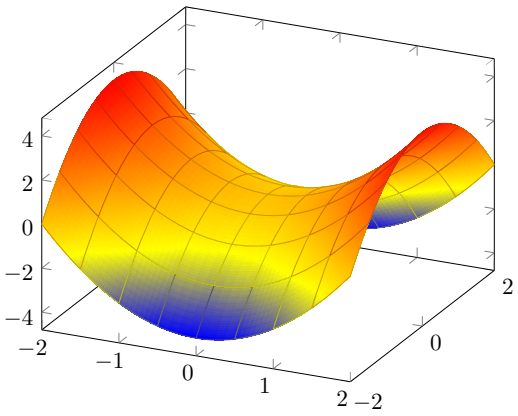

Figure 1. Example figure (obtained from *PGFPlots - A LaTeX package to create plots.* [Online]. Available: https://pgfplots.sourceforge.net/).

2.5.2. Tables

The `\captionsetup[table]` command customizes the appearance of the captions for tables in the document. The `\tabletext{}` is used to add notes to tables easily. Table 1 shows an example table.

Table 1. Small table example.

Column 1	Column 2
Data 1	Data 2
Data 3	Data 4

Note: I'm a table text for additional information.

2.6. Equation

Equation 1 shows an example equation.

$$\frac{\hbar^2}{2m}\nabla^2\Psi + V(\mathbf{r})\Psi = -i\hbar\frac{\partial\Psi}{\partial t} \tag{1}$$

The *amssymb* package was not necessary to include, because stix2 font incorporates mathematical symbols for writing quality equations.

In case you choose another font, uncomment the package in *tau class* code.

If you want to change the values that adjust the spacing above and below the equations, go to *tau class-math packages* section and play with `\setlength{\eqskip}{8pt}` value until the preferred spacing is set. See appendix for more information.

3. Environment

The *tau class* includes custom environments designed to enhance the presentation of information within documents. Among these custom environments are **tauenv**, **info** and **note** defined in *tauenvs.sty*.

Custom title

This is an example of the custom title environment. To add a title type `[frametitle=Your title]` next to the beginning of the environment (as shown in this example).

One of the main features of the info and note environment is that they automatically change the language of their titles (currently English and Spanish) but, you can make a modification in *tauenvs.sty*. See appendix for more information.

4. Adding codes

Tau class includes the *listings* package [1], which offers versatile and customizable features for adding codes in LaTeX documents. Specifically for C, C++, LaTeX and Matlab codes.

For C and C++ codes, the *listings* package recognizes the syntax of these programming languages and highlights keywords, comments, and string literals accordingly.

Similarly, for Matlab codes, the *listings* package offers syntax highlighting and line numbering.

```
function fibonacci_sequence(num_terms)
    % Initialize the first two terms of the sequence
    fib_sequence = [0, 1];

    if num_terms < 1
        disp('Number of terms should be greater than or equal to 1.');
        return;
    elseif num_terms == 1
        fprintf('Fibonacci Sequence:\n%d\n', fib_sequence(1));
        return;
    elseif num_terms == 2
        fprintf('Fibonacci Sequence:\n%d\n%d\n', fib_sequence(1), fib_sequence(2));
        return;
    end

    % Calculate and display the Fibonacci sequence
    for i = 3:num_terms
        fib_sequence(i) = fib_sequence(i-1) + fib_sequence(i-2);
    end

    fprintf('Fibonacci Sequence:\n');
    disp(fib_sequence);
end
```

Code 1. Example of Matlab code.

5. References

The default formatting for references follows the IEEE style. This style is commonly used for technical documents, research papers, and scholarly articles in engineering fields [1].

At the end of the document, you will find an example of the default reference formatting [2]. You can modify the style of your references in the *biblatex* section in *tau.cls*. See appendix for more information.

[1] Hello there! I am a footnote.

6. Appendix

6.1. Alternative title

You can make the following modification to *tau class* in the *title preferences* section to change the position of the title. This will move the title to the center.

```
\newcommand{\titlepos}{\Centering}
```

Code 2. Alternative title.

6.2. Equation skip value

Play with the value of `\eqskip` until the preferred spacing is set for equations.

```
\newlength{\eqskip}\setlength{\eqskip}{8pt}
\expandafter\def\expandafter\normalsize\expandafter{%
    \normalsize%
    \setlength\abovedisplayskip{\eqskip}%
    \setlength\belowdisplayskip{\eqskip}%
    \setlength\abovedisplayshortskip{\eqskip-\
     baselineskip}%
    \setlength\belowdisplayshortskip{\eqskip}%
}
```

Code 3. Equation skip code.

6.3. Environments

6.3.1. Environments language

The following code defines the language for the environment note

```
\newcommand{\notelanguage}{
    \iflanguage{spanish}{
        {\bfseries\noindent Nota}%
    }{%
        {\bfseries\noindent Note}   % Modify if
     required in another language
    }%
}
```

Code 4. Note language.

and info,

```
\newcommand{\infolanguage}{
    \iflanguage{spanish}{
        {\bfseries\noindent Informaci\'on}%
    }{%
        {\bfseries\noindent Information}    % Modify if
      required in another language
    }%
}
```

Code 5. Info language.

6.3.2. Note

This code defines the note environment.

Note

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vestibulum justo quis massa aliquet, ut ultrices quam bibendum.

```
\newmdenv[
  backgroundcolor=taucolor!22,
  linecolor=taucolor,
  linewidth=0.7pt,
  frametitle=\vskip0pt\bfseries\notelanguage,
  frametitlerule=false,
  frametitlefont=\color{taucolor}\bfseries\sffamily,
  frametitlealignment=\raggedright,
  innertopmargin=3pt,
  innerbottommargin=6pt,
  innerleftmargin=6pt,
  innerrightmargin=6pt,
  font=\normalfont,
  fontcolor=taucolor,
```



```
  frametitleaboveskip=3pt,
  skipabove=10pt
]{note}
```

Code 6. Note environment code.

6.3.3. Info

This code defines the info environment.

Information

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vestibulum justo quis massa aliquet, ut ultrices quam bibendum.

```
\newmdenv[
  backgroundcolor=taucolor!22,
  linecolor=taucolor,
  linewidth=0.7pt,
  frametitle=\vskip0pt\bfseries\infolanguage,
  frametitlerule=false,
  frametitlefont=\color{taucolor}\bfseries\sffamily,
  frametitlealignment=\raggedright,
  innertopmargin=3pt,
  innerbottommargin=6pt,
  innerleftmargin=6pt,
  innerrightmargin=6pt,
  font=\normalfont,
  fontcolor=taucolor,
  frametitleaboveskip=3pt,
  skipabove=10pt
]{info}
```

Code 7. Info environment code.

6.4. References

This code defines the reference style, you can modify it directly in the *tau.cls-biblatex* section if required.

```
\RequirePackage[
    backend=biber,
    style=ieee,
    sorting=ynt
]{biblatex}

\addbibresource{tau.bib}
```

Code 8. References style.

7. Contact me

Enjoy writing with tau LaTeX class

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References

[1] A. Einstein, “Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]”, *Annalen der Physik*, vol. 322, no. 10, pp. 891–921, 1905. DOI: http://dx.doi.org/10.1002/andp.19053221004.

[2] P. A. M. Dirac, *The Principles of Quantum Mechanics* (International series of monographs on physics). Clarendon Press, 1981, ISBN: 9780198520115.