DRP TeX Workshop

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Contents

Abstract

Your abstract.

1 Organization

- Table of Contents: `\tableofcontents`
- Abstract:

```
\begin{abstract}
    Your abstract.
\end{abstract}
```

1.1 Sections

- `\section{}`, `\subsection{}`, even `\subsubsection{}`
- add `*` to the name to leave un-numbered
  - Will not show up under the table of contents

2 Including Stuff

2.1 Figures

```
\begin{figure}[h]
    \centering
    \includegraphics[width=0.3\textwidth]{frog.jpg}
    \caption{This frog was uploaded via the project menu.}
    \label{fig:frog}
\end{figure}
```

Figure 1: This frog was uploaded via the project menu.

For multiple figures, use the `caption` and `subcaption` packages.

```
\begin{figure}[h]
    \centering
    \begin{subfigure}{0.3\textwidth}
        \centering
        \includegraphics[width=\textwidth]{frog.jpg}
        \subcaption{Subcaption}
        \label{fig:frog1}
    \end{subfigure}
    \hfill
    \begin{subfigure}{0.3\textwidth}
        \centering
        \includegraphics[width=\textwidth]{frog.jpg}
        \subcaption{Subcaption}
        \label{fig:frog2}
    \end{subfigure}
    \caption{Caption}
\end{figure}
```

(a) Subcaption

(b) Subcaption

Figure 2: Caption

2.2 Tables

Example table

$$x^2$$

Code:

Column 1	Column 2	Column 3
entry	entry	entry
entry	cos(0)	10.5

Table 1: Example table.

```
\begin{table}[h]
    \centering
    \begin{tabular}{|c||c|c|}
        \hline
         Column 1 & Column 2 & Column 3 \\
         \hline
         entry & entry & entry \\
         entry & $x^2$ & $10.5$ \\
         \hline
    \end{tabular}
    \caption{Example table.}
    \label{tab:table_example}
\end{table}
```

2.3 Hyperlinks

You can label equations, figures, and tables with `label{name}`. To reference, use `ref:name` or `eqref`.

- equation 2, figure 1, table 1.
- equation (2), figure (1), table (1).

For url's, you can use either `\url` or `\href`:

- url: https://www.math.ucsb.edu/
- hyperlink: Home Page

$$\begin{aligned} 1+2+3+4 &= 3+3+4 && \text{associativity of addition} \\ &= 6+4 \end{aligned}$$

$$\begin{aligned} 1+2+3+4 &= 3+3+4 \\ &= 6+4 \end{aligned} \tag{1}$$

3 Theorem and Proof Environments

Syntax for theorem environments

```
\newtheorem{theorem}{Name}[numbering]
```

Can use `\newtheorem*` for un-numbered theorem environments. In general:

- `section` for definitions, propositions, theorems
- `theorem` for lemmas and corollaries, will attach the numbering after the most recent theorem environment

Theorem 3.1. *Let $f : [a, b] \to \mathbb{R}$. Then the following are equivalent:*

1. *f is absolutely continuous.*
2. *f has a derivative f' a.e. that is Lebesgue-integrable, and*

$$f(x) = f(a) + \int_a^b f'(x)\,\mathrm{d}x \tag{2}$$

   for all $x \in [a, b]$.

3. *There exists $g \in L^1([a, b])$ such that*

$$f(x) = f(a) + \int_a^b g(x)\,\mathrm{d}x \tag{3}$$

   for all $x \in [a, b]$.

Proof of Something. Need to use `amsthm` package for proof environemnts. □

Theorem environments can have names:

Lemma 3.1.1 (Tube Lemma)**.** *Let X and Y be topological spaces with Y compact. If N is an open set containing a slice $x \times Y$ in $X \times Y$, then there is an open set $U \subseteq X$ containing x such that $U \times Y \subseteq N$.*

Theorems can be hyperlinked: 3.1, (3.1.1).

4 tikz-cd

- Need package `tikz-cd`
- Documentation

Example:

$$\begin{array}{ccc} G & \xrightarrow{\varphi} & \varphi(G) \\ \downarrow{\scriptstyle \pi} & \nearrow{\scriptstyle \widetilde{\varphi}} & \\ G/\ker\varphi & & \end{array} \tag{4}$$

Code for above (use in equation setting)

```
\begin{tikzcd}
    G \arrow[d,"\pi"'] \arrow[r, "\varphi"] & \varphi(G)  \\
    G/\ker\varphi \arrow[ur,dashrightarrow, "\widetilde{\varphi}"']
\end{tikzcd}
```

- Can reference like an equation: diagram 4
- Arrow syntax:

  `\arrow`[*direction, arrow tips, "name", options*]

- Use `"name"'` for the name option to make the name appear on the other side of the arrow.
- quiver for drawing and converting to tikz-cd

5 How to add Citations and a References List

You can upload a `.bib` file containing your BibTeX entries, created with JabRef; or import your Mendeley, CiteULike or Zotero library as a `.bib` file. You can then cite entries from it, like this: [Gre93]. Just remember to specify a bibliography style, as well as the filename of the `.bib`.

You can find a video tutorial here to learn more about BibTeX.

You can also manually input the bibliography as follows:

```
% this is to include the bibliography in the table of contents
\phantomsection
\addcontentsline{toc}{section}{Bibliography}
\begin{thebibliography}{99} % number of references included
    \bibitem{ref} info
\end{thebibliography}
```

6 Other Helpful Things

- Stack Exchange is your friend.
- Want display breaks? Use `\allowdisplaybreaks`.
- Macros, macros, macros!
  - Example: $\mathbb{R}$
  - Example: `\newcommand{\paren}[1]{\left( #1 \right)}`
  - Don't be this guy:
    $$(\frac{1}{2})$$
  - Can use `\DeclareMathOperator{\macro}{Name}` for `mathrm` operator names
- Piecewise functions

$$\delta(x) \coloneqq \begin{cases} 0, & \text{if } x \neq 0, \\ \infty, & \text{if } x = 0. \end{cases} \tag{5}$$

```
\delta(x) \coloneqq
\begin{cases}
    0 , & \quad \text{if } x \neq 0 , \\
    \infty , & \quad \text{if } x = 0.
\end{cases}
```

- Tired of Overleaf's orange warning that can't go away? Use `\pgfplotsset{compat=1.15}`
- Use spacing and indents strategically.
- Beware of typos!

Some helpful resources:

- TeXample for examples
- Wikibooks LaTeX/Mathematics for math symbols

References

[Gre93] George D. Greenwade. The Comprehensive Tex Archive Network (CTAN). *TUGBoat*, 14(3):342–351, 1993.