GradSchoolEssentials

LaTeX *Style Guide — ver. 0.9*

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Contents

1 Motivation

Hey there, LaTeX ninja, and thanks for your interest in this project! It all started in 2021, when I finally tired of typing out some opaque, monstrous expression[1] when all I wanted to see was a simple $\frac{\partial \hat{\boldsymbol{x}}}{\partial t}$! With gradschoolessentials, printing this expression is as easy as `\pd{\bhats{x}}{t}`, which I believe is a more literate approach.

Stated plainly, this style file provides macros to quickly and conveniently produce the high-quality typesetting that TeX is famous for. The style guide itself is intended as a working document, so check the github (https://github.com/rigzridge/gradschoolessentials) for more information.

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[1] `\frac{\partial\hat\boldsymbol{x}}{\partial t}`

2 Initialization

Using gradschoolessentials is as simple as including as single `\usepackage{}` command! The following is a minimum working example:

```
\documentclass{article}
\usepackage[utf8]{inputenc}

\usepackage[blue]{gradschoolessentials}

\begin{document}
$$\N\in\Z\in\Q\in\R\in\C$$
\end{document}
```

3 Environments

The gradschoolessentials style provides three new environments to simplify homework. Indexing is done automatically, and the operation of `\label{}` and `\ref{}` is analogous to its use in `\section{}`, `\subsection{}`, `\subsubsection{}`.

3.1 problem

Likely a homework problem, and numerically indexed. Importantly, the counter associated with `problem` (*i.e.*, `\theproblem`) will reset when a new section is created.

Example of `problem` environment

```
\begin{problem}\label{prob::e^-tx}
    Here is an example problem. Show that
    $$\int_0^\infty e^{-tx} dx = \frac{1}{t}.$$
\end{problem}
```

Problem 1 .....

Here is an example problem. Show that

$$\int_0^\infty e^{-tx} dx = \frac{1}{t}.$$

3.2 subprob

An alphabetically indexed subproblem. Will appear as current `\sectioncolor` (must adjust `gradschooolessentials.sty` to change).

A `problem` with `subprob`

```
\begin{problem}\label{prob::factorial}
    \begin{subprob}\label{subprob::gamma}
        Using the results of Problem \ref{prob::e^-tx},
        verify the well-known relation
        $$\int_0^\infty x^ne^{-x} dx = n!.$$
    \end{subprob}
    \begin{subprob}
        Confirm your result for part \ref{subprob::gamma}
        using repeated integration by parts.
    \end{subprob}
\end{problem}
```

Problem 2 .....

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(a) Using the results of Problem 1, directly verify the well-known relation

$$\int_0^\infty x^n e^{-x} dx = n!.$$

(b) Confirm your result for part **(a)** using repeated integration by parts.

3.3 `subsubprob`

A sub-subproblem, indexed by an italic, lower-case roman numeral. Will appear as current `\sectioncolor`.

A `problem` with `subprob` and `subsubprob`

```
\begin{problem}\label{prob::factorial}
    \begin{subprob}\label{subprob::gamma}
        Using the results of Problem \ref{prob::e^-tx},
        verify the well-known relation
        $$\int_0^\infty x^ne^{-x} dx = n!.$$
    \end{subprob}
    \begin{subprob}
        Confirm your result for part \ref{subprob::gamma}
        using repeated integration by parts.
    \end{subprob}
\end{problem}
```

Problem 3 .....

(a) Using the results of Problem 1, verify the well-known relation

$$\int_0^\infty x^n e^{-x} dx = n!.$$

(b) Confirm your result for part (a) using repeated integration by parts.

4 Tools

4.1 `hwtitle`

4.2 `ans`

4.3 `anst`

5 Sets

5.1 `N`

Natural numbers

`$n\in\N\implies n+1\in\N$` $n \in \mathbb{N} \implies n+1 \in \mathbb{N}$

5.2 `Z`

Integers

`$n\in\Z\implies n^2\in\N$` $n \in \mathbb{Z} \implies n^2 \in \mathbb{N}$

5.3 Q

5.4 R

5.5 C

5.6 set

5.6.1 bigset

5.6.2 biggset

5.6.3 Bigset

5.6.4 Biggset