A Template File for Writing \LaTeX Articles

(Originally Written for Math 270A class.)

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Abstract

In this article, we want to provide some templates for the frequently used features in \LaTeX, such as lists and tables.

1 Introduction

We want to give you some templates in this article which we think you will use the most. These are intended for those who never used \TeX or \LaTeX before. To uses this template, make sure the format selected is \LaTeX (the button next to the Typeset button), then press the Typeset button.

We suggest two books for reference [1] and [2]. Please consult these books or your favorite books for details.

2 Making lists, arrays and tables

The \texttt{\label} (used above) is for use in referencing the section (or equation or table, etc.) at other places in the same article.

To make an enumerated list, do the following:

1. It is easy.

2. I can even put an equation here

\[ u_t + f(u)_x = 0 \]
To make an itemized list, do the following:

- It is easy.
- I can even put an equation here

\[ u_t + f(u)_x = 0 \]

To make a table, centered and with caption and label, follow the following procedure. Again the label is for referencing at other places of the same article, e.g., see Table 1. Table is a floating object, i.e. it may not be printed right after this text. \LaTeX{} will find a suitable place to put it along with other floating objects like figures. Similar environments as tabular below are array, tabbing. Notice that the tabular environment itself is not a floating object, it becomes one when it is embedded in the table environment. A caption is not allowed in tabular.

<table>
<thead>
<tr>
<th>( C^r_k )</th>
<th>k=0</th>
<th>k=1</th>
<th>k=2</th>
</tr>
</thead>
<tbody>
<tr>
<td>r=2</td>
<td>1/3</td>
<td>2/3</td>
<td>—</td>
</tr>
<tr>
<td>r=3</td>
<td>1/10</td>
<td>6/10</td>
<td>3/10</td>
</tr>
</tbody>
</table>

**Table 1**: Optimal weights \( C^r_k \).

### 3 Equations and Theorems

The \texttt{setcounter} command allows us to re-set the equation counter.

To write one equation,

\[ u_t + f(u)_x = 0 \]  \hspace{1cm} (3.1)

To write an equation with a two line right-hand-side,

\[ u(x, 0) = \begin{cases} 
   u_l & \text{if } x \leq 0, \\
   u_r & \text{if } x > 0.
\end{cases} \]  \hspace{1cm} (3.2)

To write several equation together, use \texttt{eqnarray} or \texttt{align}. The label is used for referencing
these equations as a group. For example, we now can reference the equation by 3.3.

\[
\begin{align*}
  u^{(1)} &= u^n + \Delta t L(u^n) \\
  u^{(2)} &= \frac{3}{4}u^n + \frac{1}{4}u^{(1)} + \frac{1}{4}\Delta t L(u^{(1)}) \\
  u^{n+1} &= \frac{1}{3}u^n + \frac{2}{3}u^{(2)} + \frac{2}{3}\Delta t L(u^{(2)})
\end{align*}
\] (3.3)

We could also have used \texttt{align}. I will give this set of equations another label, since repetition of labels is not permitted.

\[
\begin{align*}
  u^{(1)} &= u^n + \Delta t L(u^n) \\
  u^{(2)} &= \frac{3}{4}u^n + \frac{1}{4}u^{(1)} + \frac{1}{4}\Delta t L(u^{(1)}) \\
  u^{n+1} &= \frac{1}{3}u^n + \frac{2}{3}u^{(2)} + \frac{2}{3}\Delta t L(u^{(2)})
\end{align*}
\] (3.4)

Here is how to write a theorem. Notice that the Theorem environment has been defined at the beginning.

**Theorem 3.1** For the initial value problem \ldots

\[
u(x_0, t_0, \Delta x) = v(x_0, t_0) + O(\Delta x^r)
\] (3.5)

**References**
