Some LaTeX examples

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April 20, 2016

1 Mechanics

This file contains some examples to get you started using LaTeX to typeset mathematics. It is the premiere software for technical publications. Good places to get started:

- `http://www.latex-tutorial.com/`
- `http://www.stdout.org/~winston/latex/latexsheet.pdf`

To compile a LaTeX file, `myfile.tex` to `myfile.pdf`, simply enter the following command:

```
pdflatex myfile.tex
```

or use a GUI such as TexWorks or TexStudio.

You can also get your LaTeX processed online, for example, at `https://www.overleaf.com/`

2 Some example text

Here is some inline math: $\sum_{i=1}^{n} i^2$ and here is the same thing with display math:

$$\sum_{i=1}^{n} i^2$$

Here is a set of equations lined up nicely:

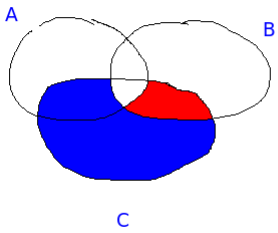
$$\begin{aligned}(a+b)^2 &= (a+b)(a+b) \\ &= a(a+b)+b(a+b) \\ &= a^2+ab+ba+b^2 && \text{Here's a comment on a line} \\ &= a^2+2ab+b^2 && \text{Simple proof!}\end{aligned}$$

You can talk about the real numbers, $\mathbb{R}$, the integers $\mathbb{Z}$, the rational numbers $\mathbb{Q}$, and the natural numbers, $\mathbb{N}$, using nice fonts. Notice how I made new commands for some of these in the preamble, to simplify typing. Here is an enumerated list:

1. $\mathcal{P}(\{1,2,3\}) \subseteq \mathcal{P}(\{1,2,3,4\})$
2. $\bigcup_{i\in\mathbb{N}} i^2 = \{0,1,4,9,\ldots\} = \{n^2 \mid n \in \mathbb{N}\}$
3. $$\bigcap_{i\in\mathbb{N}} i^2 \neq \{0,1,4,9,\ldots\}$$

3 Figures

You can also include and scale figures:



4 Algorithms

If you're using the CLRS book in an algorithms class, you can download the `clrscode3d.sty` file and use it like this:

```
\usepackage{clrscode3d.sty}
```

and then you can enter the code on the left to get the algorithm on the right:

```
\begin{codebox}
\Procname{$\proc{Insertion-Sort}(A)$}
\li \For $j \gets 2$ \To $\attrib{A}{length}$
\li
\Do
$\id{key} \gets A[j]$
\li
\Comment Insert $A[j]$ into the sorted sequence
$A[1 \twodots j-1]$.
\li
$i \gets j-1$
\li
\While $i > 0$ and $A[i] > \id{key}$
\li
\Do
$A[i+1] \gets A[i]$
\li
$i \gets i-1$
\End
\li
$A[i+1] \gets \id{key}$
\End
\end{codebox}
```

INSERTION-SORT(A)

1 **for** $j = 2$ **to** $A.length$
2 $key = A[j]$
3 // Insert $A[j]$ into the sorted sequence $A[1 \twodots j-1]$.
4 $i = j - 1$
5 **while** $i > 0$ and $A[i] > key$
6 $A[i+1] = A[i]$
7 $i = i - 1$
8 $A[i+1] = key$