LaTeX for Undergraduates
Theorem Environment
Lecture Notes

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Version of January 15, 2006

1 Motivation

The theorem package allows the author to display theorems that stand out against normal text. Each theorem will be automatically numbered by LaTeX. The theorem environment is a bit misleading. The author may change the environment to the Lemma or Conjecture environment. Whatever the name, the environments will have the same formatting.

2 Theorems

2.1 Preamble Commands

The theorem environment does not only display theorems, it also displays lemmas, conjectures, or whatever the author wants. In the preamble, the author declares how theorems are labeled and what command is used to start the environment. The following example will label all theorems "Lemma" and the environment is started with "lem."

```
\begin{lem}{Lemma}
```

The author may add additional theorem environments. Along with the Lemma, one may also add a Corollary environment as well.

```
\newtheorem{lem}{Lemma}
\newtheorem{thm}{Theorem}
```

Theorems can correspond to the section number using the following:

```
\newtheorem{cor}{Corollary}[section]
```

2.2 Creating Theorems

The Lemma that was defined earlier can be recalled with:

```
\begin{lem} Let lim$_{x \rightarrow a}$
$f(x) = L.$ Then there exists
$\delta > 0$ such that if
$0 < \left|x-a\right| < \delta,$
then $\left|f(x)\right| < 1 + \left|L\right|$.
\end{lem}
```

Which will display the following Lemma:

Lemma 1 *Let* $lim_{x \to a}\ f(x) = L$. *Then there exists* $\delta > 0$ *such that if* $0 < |x - a| < \delta$, *then* $|f(x)| < 1 + |L|$.

Likewise, the same document can also create the Theorem (with parenthesis) using:

```
\begin{thm}[Schr\ddot{o}der -- Bernstein] If
A and B are sets such that \left|A\right|
\leq \left|B\right| and \left|B\right|
\leq \left|A\right|, then \left|A\right|
= \left|B\right|.
\end{thm}
```

Which will display the following Lemma:

Theorem 1 (Schröder – Bernstein) *If* A *and* B *are sets such that* $|A| \leq |B|$ *and* $|B| \leq |A|$, *then* $|A| = |B|$.

Lastly, the following Corollary corresponds to the section numbers:

```
\begin{cor} The sets $2^{\textbf{N}}$ and
\textbf{R} are numerically equivalent.
\end{cor}
```

Corollary 2.1 *The sets* $2^{\boldsymbol{N}}$ *and* $\boldsymbol{R}$ *are numerically equivalent.*

3 Conclusion

Making theorems are rather easy. Remember to follow any rules that a professor gives regarding how theorems should be identified.