LATEX2MARKDOWN EXAMPLES

ANDREW TULLOCH

1. Simple Examples

This section introduces the usage of the LaTeX2Markdown tool, showing an example of the various environments available.

Theorem 1.1 (Euclid, 300 BC)**.** *There are infinitely many primes.*

Proof. Suppose that $p_1 < p_2 < \cdots < p_n$ are all of the primes. Let $P = 1 + \prod_{i=1}^{n} p_i$ and let p be a prime dividing P.

Then p can not be any of p_i, for otherwise p would divide the difference $P - (\prod_{i=1}^{n} p_i) - 1$, which is impossible. So this prime p is still another prime, and $p_1, p_2, \ldots p_n$ cannot be all of the primes. □

Exercise 1.2. *Give an alternative proof that there are an infinite number of prime numbers.*

To solve this exercise, we first introduce the following lemma.

Lemma 1.3. *The Fermat numbers $F_n = 2^{2^n} + 1$ are pairwise relatively prime.*

Proof. It is easy to show by induction that

$$F_m - 2 = F_0 F_1 \ldots F_{m-1}.$$

This means that if d divides both F_n and F_m (with $n < m$), then d also divides $F_m - 2$. Hence, d divides 2. But every Fermat number is odd, so d is necessarily one. This proves the lemma. □

We can now provide a solution to the exercise.

Theorem 1.4 (Goldbach, 1750)**.** *There are infinitely many prime numbers.*

Proof. Choose a prime divisor p_n of each Fermat number F_n. By the lemma we know these primes are all distinct, showing there are infinitely many primes. □

2. Demonstration of the environments

We can format *italic text*, **bold text**, and `code` blocks.

(1) A numbered list item
(2) Another numbered list item

- A bulleted list item
- Another bulleted list item

Theorem 2.1. *This is a theorem. It contains an* `align` *block.*

All math environments supported by MathJaX should work with LaTeX - a full list is available on the MathJaX homepage.

Maxwell's equations, differential form.

$$\begin{aligned}
\nabla \cdot \mathbf{E} &= \frac{\rho}{\varepsilon_0} \\
\nabla \cdot \mathbf{B} &= 0 \\
\nabla \times \mathbf{E} &= -\frac{\partial \mathbf{B}}{\partial t} \\
\nabla \times \mathbf{B} &= \mu_0 \mathbf{J} + \mu_0 \varepsilon_0 \frac{\partial \mathbf{E}}{\partial t}
\end{aligned}$$

Theorem 2.2 (Theorem name)**.** *This is a named theorem.*

Lemma 2.3. *This is a lemma.*

Proposition 2.4. *This is a proposition*

Proof. This is a proof. □

```
This is a code listing.
One line of code
Another line of code
```