

lean-architect-example

Thomas Zhu

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Chapter 1

Natural numbers

Definition 1 (Natural numbers).

1.1 Addition

Here we define addition of natural numbers.

Definition 2. Natural number addition.

Theorem 3. *For any natural number a , $0 + a = a$, where $+$ is Def. 2.*

Proof. The proof follows by induction. □

Theorem 4. *For any natural numbers a, b , $(a + 1) + b = (a + b) + 1$.*

Proof. Proof by induction on b . □

Theorem 5. *For any natural numbers a, b , $a + b = b + a$.*

Proof. The base case follows from 3.

The inductive case follows from 4. □

1.2 Multiplication

Definition 6. Natural number multiplication.

Theorem 7. *For any natural numbers a, b , $a * b = b * a$.*

Proof. □

1.3 Fermat's Last Theorem

Theorem 8 (Taylor–Wiles). *Fermat's last theorem.*

Proof. See [1, 2]. □

In the docstring, usual Markdown features and math mode are supported (by MD4Lean), with additional support for citations like [1] using [square brackets] and references to other nodes like 3 using inline ``code``.

You can also directly input raw LaTeX, e.g. as follows:

Bibliography

- [1] Andrew Wiles (1995) *Modular elliptic curves and Fermat's last theorem*, Annals of Mathematics, 141(3), 443–551.
- [2] Richard Taylor and Andrew Wiles (1995) *Ring-theoretic properties of certain Hecke algebras*, Annals of Mathematics, 141(3), 553–572.