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0.1 Axiom of union

0.1.1 Motivation

While we have described various sets, we have not said that they exist. That is, if A and B both exist, then currently we cannot ensure $A \wedge B$ exists, just that it can be described.

The axiom of union enables us to ensure all sets from unions and intersections exist.

0.1.2 Axiom of union

$\forall a \exists b \forall c [c \in b \leftrightarrow \exists d (c \in d \wedge d \in a)]$

That is, for every set a, there exists a set b where all the elements in b are the elements of the elements in a.

Here, b is the union of the sets in a.