

Homotopy Type Theory

Under-graduate Project

1 Section 1 : Fundamentals

1.1 Proposition-as-Types

The basic judgement of Type Theory, analogous to the proposition, A has a proof, is $\mathbf{a} : \mathbf{A}$, where

A is the proposition

a is the proof of the proposition A

A proposition can have multiple proofs, which can be expressed as

$\mathbf{a}, \mathbf{b} : \mathbf{A}$, where a and b are different proofs of A . In Type Theory Proposition

A is a type and its proofs, i.e. a and b are called witnesses of A . A type having a witness is called an inhabited type while a proposition having no proof is termed as an uninhabited type. For instance while $1=2$ is a valid proposition, it has no witness and hence an uninhabited type.

1.2 Universes