Issue XI: Set Theory

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Abstract

CW-complexes are fundamental objects in homotopy type theory and even included inside cubical type checker in a form of higher (co)-inductive types (HITs). Just like regular (co)-inductive types could be described as recursive terminating (well-founded) or non-terminating trees, higher inductive types could be described as CW-complexes. Defining HIT means to define some CW-complex directly using cubical homogeneous composition structure as an element of initial algebra inside cubical model.

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Contents

1 Prerequisites

1.1 ETCS

Lawvere's theory ETCS (Lawvere 2005) has eight axioms: (L1) finite roots exist, (L2) the exponential of any pair of objects exist, (L3) there is a Dedekind-Peano object, (L4) the terminal object is separating, (L5) axiom of choice, (L6) every object not isomorphic to an initial object contains an element, (L7) Each element of a sum is a member of one of its injections, (L8) there is an object with more than one element.