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Kristina Sojakova* (ksojakov@cs.cmu.edu). *Higher Inductive Types as Homotopy-Initial Algebras.*

Homotopy type theory is a new field of mathematics based on the recently-discovered correspondence between constructive type theory and abstract homotopy theory.

Higher inductive types, which form a crucial part of this new system, generalize ordinary inductive types such as the natural numbers to higher dimensions. We will look at a few different examples of higher inductive types such as suspensions, quotients, and the torus, indicating how we can use their associated induction principle to reason about them.

We will introduce a general class of higher inductive types which we call W -quotients as a combination of well-founded trees and quotients, and indicate how the particular examples of higher inductive types we saw previously - of different structure and dimension - all arise as special cases of W -quotients.

Finally, we show that just like the natural numbers arise as initial algebras of a certain form, a W -quotient (and hence a suspension, a quotient, and the torus) arises naturally as a homotopy-initial algebra of a certain form. (Received September 26, 2017)