Homotopy Type Theory (L16)

Non-Examinable (Graduate Level)

Professor S. Awodey

This lecture course will provide an introduction to Homotopy type theory, a new area of foundations combining homotopy theory, type theory, and higher category theory.

The course will cover the following topics, in roughly equal sections:

- Review of category theory
- Cartesian closed categories and simple type theory
- Locally Cartesian closed categories and dependent type theory
- Quillen model categories and homotopy type theory

Prerequisites

The course has no essential prerequisites, but the basics of homotopy theory as taught in Part II *Algebraic Topology* and the basics of type theory as taught in Part III *Logic & Computation* are useful.

Literature

Lecture notes will be provided on the basis of a textbook in progress: *Introduction to Categorical Logic and Type Theory* (with Andrej Bauer). The following textbooks serve as additional references:

1. Steve Awodey, *Category Theory*, Oxford Logic Guides 52, Oxford University Press, 2010.
2. Egbert Rijke, *Introduction to Homotopy Type Theory*, Cambridge University Press, 2025.
3. The Univalent Foundations Program, *Homotopy Type Theory: Univalent Foundations of Mathematics*, Institute for Advanced Study, 2013.
   Available at https://homotopytypetheory.org/book.