

Formal Semantics in Modern Type Theories

An Overview

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I'll give an overview, and report some recent developments, of Formal Semantics in Modern Type Theories (MTT-semantics for short) by focussing on the following:

1. The rich structures in MTTs, together with subtyping, make MTTs a nice and powerful framework for formal semantics of natural language.
2. MTT-semantics is both model-theoretic and proof-theoretic and hence a very attractive semantic framework.

By explaining the first point, we'll introduce MTT-semantics and, at the same time, show that the use and development of coercive subtyping play a crucial role in making MTT-semantics viable. The second point shows that MTTs provide a unique and nice semantic framework that was not available before for linguistic semantics. Being model-theoretic, MTT-semantics provides a wide coverage of various linguistic features and, being proof-theoretic, its foundational languages have proof-theoretic meaning theory based on inferential uses (appealing philosophically and theoretically) and it establishes a solid foundation for practical reasoning in natural languages on proof assistants such as Coq (appealing practically). Altogether, this strengthens the argument that MTT-semantics is a promising framework for formal semantics, both theoretically and practically.

Here is a longer abstract with references: <https://www.cs.rhul.ac.uk/home/zhaohui/PTS19.pdf>