Dependent Types and Theorem Proving: Introduction to Dependent Types

Wojciech Kołowski

March 2021

1. Intro: greetings, prerequisites, learning outcomes, plan of lectures, F*
2. General idea
3. First-class types
   - What does "first-class" mean?
   - Computing with types
4. Dependent functions
   - Example: typesafe printf
   - How to express polymorphism
   - Implicit arguments and how to read function signatures
5. Dependent pairs
   - Example: everybody loves filling forms
6. Optional:
   - Sigma
   - Pi
   - Plus, cross and arrow
7. Inductive families
   - Example: length-indexed lists
   - Example: enforcing protocols