Project Description

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Goal & Background

The goal of this master project is to formalize (a part of) the proofs of the following paper, and extract algorithms from these formalized proofs: These algorithms shall be tested on a number of carefully chosed benchmarks, and their performance will be compared to known algorithms that solve these benchmarks. We will anaylyze the results of these experiments as a case study as to whether the methodology of extracting programs from proofs is viable. The results will be compared to the existing litterature etc...

Methodology

Formalization

The formalization will be done in the Isabelle/HOL theorem prover.

Extraction

The extracted programs will be written in the programming language Haskell.

Testing

The extracted programs will be tested on a number of carefully chosed benchmarks. The benchmarks will be chosen from the following papers:

- [**Bakseter2015**]

- [**Bakseter2016**]

Analysis

The results of the experiments will be analyzed as a case study as to whether the methodology of extracting programs from proofs is viable. The results will be compared to the existing litterature etc...

Something else

The paper above actually solves two problems that occur in dependant type systems where typings depend on universe-level constraints. We will reinterpret the results of this master project in type theory and dependant type theory, and assess their potential to be used in proof assistants such as Coq [ref] and Agda [ref].