Abstract (draft)

Mark Lemay

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Dpendnet types offer a uniform foundation for both proof systems and programing languages. While the proof systems built with dependent types have become relatively popular, dtepentently typed programing langugages are far from mainstream.

One key issue with existing dependently typed languages, is the overly conservative definitional equality that programmers are forced to use. When combined with a traditional typing workflow, these systems can be quite challenging and require a large amount expertise to master.

This thesuss explores an alternative workflow and a more libral handling of equality. Programmers are given warnings that contain the same information as type errors. Programs can be run these programs optimisitically, and they will behave in a type sound manner unless a direct contrediction confirming the warning is found.

This is achieved, by localizing the constraints using a new form of elaboration based on bidriectional type inference. These local checks, or casts are given a runtime behavour (similar to those of contract systems and monitors), these elaborated terms have a weakened form of type soundness, they will not they will not get stuck without an explicit counter example.

The langauge explored in this thesus will be a calculus of constructions like languagw with recursion, type-in-type, user defined data and pattern matching.

Several metatheoetic results will be presented. The key result, is the cast system, "will not get stuck without a counter example", a result called **cast soundness**. A proof of cast soundness is fully worked out for the fragment of the language with out user defined data, and a Coq proof is availible. Several other properties based on the gradual gaurentees of gradual typing are also presented. In the presnece of user defined data these properties seem likely but are too complicated yo prove here.

An prototype implementation of this work is availibe.

> review of not new stuff

Part I
TODO

Todo list

1 notes

"The abstract should contain a clear and brief statement of the problem, the procedure(s) and/or method(s) followed, the result(s), and the conclusion(s). The purpose of an abstract is to help a reader decide if they want to consult the complete work. As with the title, the abstract is searchable in many databases, including ProQuest Dissertations & Theses Global. Include relevant place names, full personal names, and other proper nouns, which can be very useful keywords for scholars locating resources."

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