CHALMERS
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TIP: Tons of Inductive Problems

… and some of the systems that use them.

What is TIP?

TIP is a collection of benchmarks for inductive theorem provers.

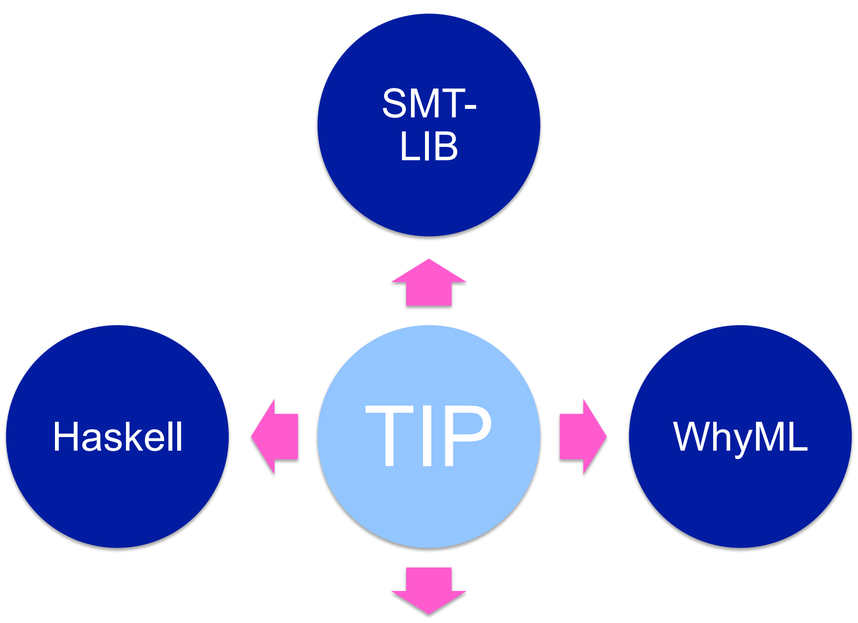
The TIP-benchmark format

The benchmarks are expressed in a language which is a variant of SMT-LIB, with added support for:

- Algebraic datatypes
- Recursive function definitions
- Pattern matching
- Polymorphic types
- Higher-order functions

The TIP-tools

We are developing a set of tools to translate to and from TIP into a variety of other formats:

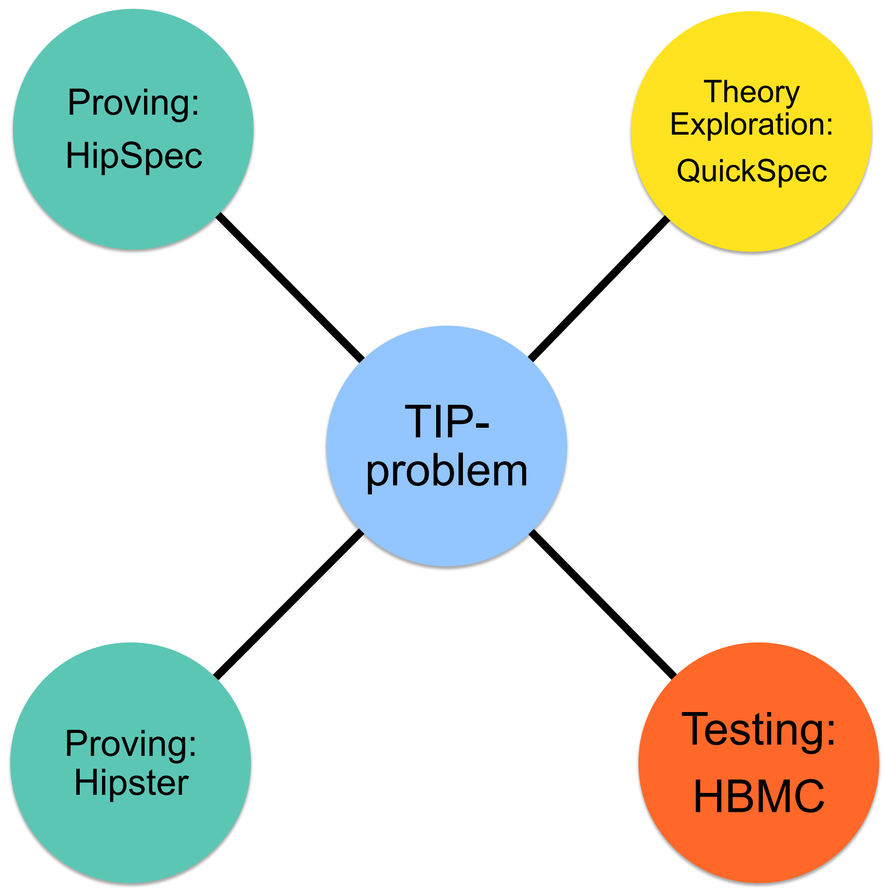


For provers not supporting all features of the TIP-format the translators can also remove higher-order constructs and monomorphise problems.

Some systems that use TIP

Our group at Chalmers are developing several tools that use and support TIP.

- **QuickSpec**: A conjecture discovery system.
- **HipSpec:** An automated inductive prover.
- **Hipster:** An automated inductive prover and theory exploration system for Isabelle/HOL.
- **HBMC:** A counter-example finder using bounded model checking.



Both HipSpec and Hipster use QuickSpec as a backend to automatically suggest interesting conjectures, which the provers then may use as lemmas in subsequent inductive proofs.

More reading

- *TIP: Tons of Inductive Problems.* Conference on Intelligent Computer Mathematics (CICM) 2015.
- *Automating Inductive Proofs Using Theory Exploration*. Conference on Automated Deduction (CADE) 2013.
- *Hipster: Integrating Theory Exploration in a Proof Assistant.* Conference on Intelligent Computer Mathematics (CICM) 2014.

Got inductive problems? Contribute to TIP!

http://tip-org.github.io