Sum[eth]

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Baire spaces!

see page 3

Burden of Proof

"For mathematicians there is no ..b..us"

D. Hilbert

- We aim to make writing proofs by computer easier through better automation.
- This will be achieved by exploiting the combined strengths of specialised tools.

Challenges

- Balancing soundness and efficiency.
- Choosing suitable source and target logics or fragments.
- Optimisation and other techniques for some logics are not yet well-developed.
- Understanding how different approaches relate to one another.

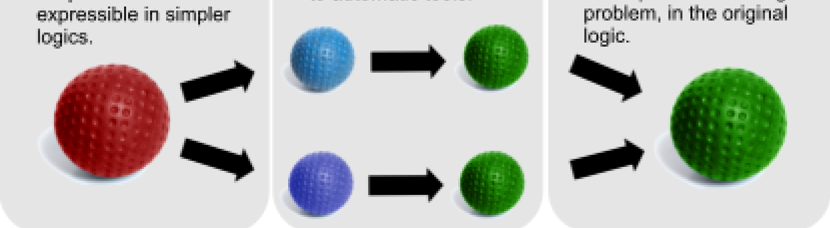
Benefits

- Proofs discovered by external tools are re-checked in the host system. This provides a high level of assurance of their correctness.
- Compared to the monolithic approach, building tools by combining simpler tools is sensible and safe.

Method

Start with a problem which has been encoded into an expressive logic, then:

1. Break problem down into simpler ones which are expressible in simpler logics.
2. Dispatch subproblems to automatic tools.
3. Compose the proofs back into a proof for the original problem, in the original logic.



Background

Mathematics relies on proofs, which can be made precise using a logic. Doing mathematics requires **creativity** and **calculation**. A computer can do calculations with far greater speed than we can. Creativity, so far, is mostly left up to us to provide. Computers have been successfully employed in **checking** our mathematics, and there have been encouraging results in automating the **proof-search** process too.

Having improved automation would help increase the scope of interactive theorem-provers such as Isabelle:

(More on Isabelle at www.cl.cam.ac.uk/research/hvg/Isabelle)

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