LEO

A Higher Order Theorem Prover

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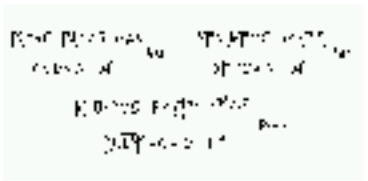
Extensional Higher Order Resolution

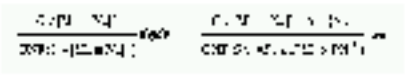
The Calculus

Higher Order Resolution

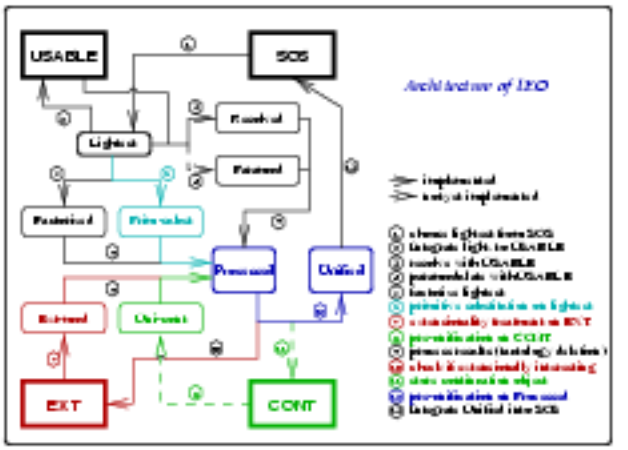


Higher Order Pre-Unification

Extensionality (Interleave Resolution an Unification)

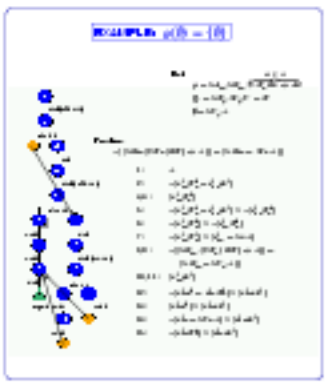


Extended Set Of Support Architecture



Proving simple theorems about sets with LEO

Boolean and Basic Properties of Sets, Journal of Formalized Mathematics Volume 1, 1989



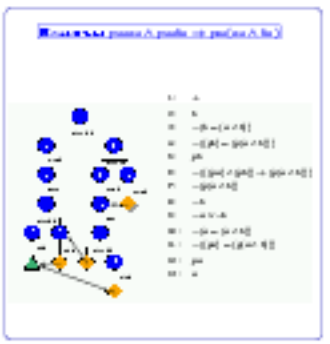
Technical Aspects of LEO

- Implemented in Allegro Common Lisp
- Based on the KEIM-Toolbox
- Automatic Mode
- Interactive Mode
- Graphical User Interface (LEO3)
- Integrated in OMEGA (LEO3)

Difficulties

- efficient Higher Order Subsumption
- Higher Order Term Indexing is not compatible with Extensional Resolution
- Leibnizequality or Primitive Equality

A very simple example with embedded Propositions



- not provable by other Systems

Conclusion and Further Work

- LEO: Henkin-Complete Extensional Higher Order Resolution
  No Extensionality Axioms required
  Interleaving of Resolution and Unification
  Well suited for simple theorems from Set Theory
- Further work: More efficient implementation
  Integration in OMEGA
  Cooperation with other Reasoning Systems
- Availability:
  http://www.ags.uni-sb.de/projects/deduktion/projects/hot/leo/

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