

Integration of Decision Procedures in Automated Reasoning Systems

Alessandro Armando

MRG-Lab

DIST, University of Genova



CALCULEMUS Autumn School

Pisa, Sept 30 – Oct 1, 2002

Decision Procedures in Automated Reasoning

Experience shows that decision procedures are a fundamental ingredient for the construction of state-of-the-art Mechanized Reasoning Systems (e.g. proof-assistants, automated theorem provers, computer algebra systems),

Decision Procedures in Automated Reasoning

Experience shows that decision procedures are a fundamental ingredient for the construction of state-of-the-art Mechanized Reasoning Systems (e.g. proof-assistants, automated theorem provers, computer algebra systems),

However,

Decision Procedures in Automated Reasoning

Experience shows that decision procedures are a fundamental ingredient for the construction of state-of-the-art Mechanized Reasoning Systems (e.g. proof-assistants, automated theorem provers, computer algebra systems),

However,

to obtain an **effective integration** is a **challenge** task.

Decision Procedures in Automated Reasoning – Continued

Main reasons:

- most systems are packaged as stand-alone software with inadequately described interfaces
- most of the research on decision procedures is focused on procedures delivering a 'yes-or-no' answer

Decision Procedures in Automated Reasoning – Continued

Main reasons:

- most systems are packaged as stand-alone software with inadequately described interfaces
- most of the research on decision procedures is focused on procedures delivering a ‘yes-or-no’ answer

Problem: *lack of comprehensive **conceptual** and **implementational** frameworks for the integration of decision procedures in mechanized reasoning systems.*

Plan of the Lectures

The lectures introduce solutions both at the conceptual and at the implementational level.

- **Conceptual level:**

- Constraint Contextual Rewriting
- Maple's evaluation process as Constraint Contextual Rewriting

- **Implementational level:**

- Rewrite and Decision procedure Laboratory (RDL)
- Logic Broker Architecture (LBA)