Integration of Decision Procedures in Automated Reasoning Systems

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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),
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However,

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