CONFident **at CoCo 2021**

Miguel Vítores[1]   Raúl Gutiérrez[2]   Salvador Lucas[1]

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[1] Valencian Research Institute for Artificial Intelligence
  Universitat Politècnica de València
  Spain
[2] Universidad Politécnica de Madrid
  Spain

Description

- CONFident is a tool for checking **(non-)confluence** of systems based on rewriting by means of its logical representation.
- Specially designed to (dis)prove confluence of
  - Conditional Term Rewriting Systems (join, oriented, and, soon, semi-equational).
  - Context-Sensitive Term Rewriting Systems.
  - Conditional Context-Sensitive Rewriting Systems.
- Also able to (dis)prove confluence of
  - Term Rewriting Systems and
  - String Rewriting Systems

Implementation

- The tool is available here:
  http://zenon.dsic.upv.es/confident/.

- It is written in Haskell and it is based on a divide-and-conquer schema where different techniques are applied recursively using a pre-defined strategy.

- The logical representation of the systems is well-suited to check **(non-)joinability** of (conditional) critical pairs:
  - Proving and disproving **conditional joinability** by translation into combinations of (in)feasibility problems.
  - Feasibility problems solved using infChecker
  - Termination and operational termination of (C)TRSs is proved using MU-TERM.

Strategy and Results

- Our **proof strategy** is:
  1. we apply simplification and modular techniques;
  2. we analyze the system to extract good properties (external tools like MU-TERM can be used to check termination and operational termination);
  3. we compute the set of conditional critical pairs;
  4. we apply the semantic based techniques to prove or disprove the joinability of the conditional critial pairs.
- CoCo SC agreed to host a **CSR subcategory** in 2022.
- Bibliography:

GLV21 R. Gutiérrez, S. Lucas, and M. Vítores. Confluence of Conditional Rewriting in Logic Form. Submitted, 2021.

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Luc19 S. Lucas. Proving semantic properties as first-order satisfiability. Artificial Intelligence 277, paper 103174, 24 pages, 2019.