VRAIN Valencian Research Institute for Artificial Intelligence

CONFident **at CoCo 2025**

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Description

- CONFident is a tool for checking **(non-)confluence** of Generalized Term Rewriting Systems (GTRSs).
- A GTRS is a tuple $\mathcal{R} = (\Omega, \mu, H, R)$, where:
  - $\Omega = (\mathcal{F}, \Pi)$ is a signature with predicates.
  - $\mu \in M_{\mathcal{F}}$.
  - H is a set of auxiliary clauses (H is used to model the semantics of conditions).
  - R is a set of rewrite rules $\ell \to r \Leftarrow c$.
- This year, our participation involves utilizing the same tool employed in the previous year.
- In the bibliography, you can find new publications on some techniques that were unpublished last year.

An Example

- Consider the GTRS $\mathcal{R}$:

$$x \geq 0 \qquad odd(x) \Leftrightarrow x \to^* s(0)$$
$$s(x) \geq s(y) \Leftrightarrow x \geq y \qquad zero(x) \Leftrightarrow x \to^* 0$$
$$peven(x) \Leftrightarrow x \to^* s(s(0)) \qquad s(s(x)) \to x \Leftrightarrow x \geq s(0)$$

- CONFident can prove the confluence of $\mathcal{R}$.

Implementation and Bibliography

- It is written in Haskell and implements the **Confluence Framework**. The tool is available here:

  `http://zenon.dsic.upv.es/confident/`

- Bibliography:

GL24 R. Gutiérez and S. Lucas. Proving Confluence in the Confluence Framework with CONFident. Fundamenta Informaticae 192, Issue 2: LOPSTR 2022, 2024.

GL25 R. Gutiérrez and S. Lucas. Proving and disproving feasibility with infChecker. In Proc. of the 14th International Workshop on Confluence, IWC'25, to appear, 2025.

GLV23 R. Gutiérez, S. Lucas and M. Vítores. Proving Confluence in the Confluence Framework with CONFident. CoRR abs/2306.16330, 2023.

Luc25 S. Lucas. Confluence of Almost Parallel-Closed Generalized Term Rewriting Systems. In Proc. of 30th International Conference on Automated Deduction, CADE-30, to appear, 2025.