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# CONFident at CoCo 2024

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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  $\ell \rightarrow r \Leftarrow c$ .
- 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- In the bibliography, you can find new publications on some techniques that were unpublished last year.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  $\mathcal{R}$ :

$$\begin{array}{ll} x \geq 0 & \text{odd}(x) \Leftrightarrow x \rightarrow^* s(0) \\ s(x) \geq s(y) \Leftrightarrow x \geq y & \text{zero}(x) \Leftrightarrow x \rightarrow^* 0 \\ \text{peven}(x) \Leftrightarrow x \rightarrow^* s(s(0)) & s(s(x)) \rightarrow x \Leftrightarrow x \geq s(0) \end{array}$$

- CONFident can prove the confluence of  $\mathcal{R}$ ... details in Salvador Lucas's talk!

# 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. Gutiérrez and S. Lucas. Proving Confluence in the Confluence Framework with CONFident. *Fundamenta Informaticae* 193, to appear, 2024.
- GLV23** R. Gutiérrez, S. Lucas and M. Vítores. Proving Confluence in the Confluence Framework with CONFident. *CoRR abs/2306.16330*, 2023.
- Luc24** S. Lucas. Orthogonality of Generalized Term Rewriting Systems. *Proc. of IWC'2024*, to appear, 2024.
- LVG22** S. Lucas, M. Vítores and R. Gutiérrez. Proving and disproving confluence of context-sensitive rewriting. *J. Log. Algebraic Methods Program.* 126: 100749, 2022.