

# CoCo 2025 Participant: CSI 1.2.7

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CSI is an automatic tool for (dis)proving confluence and related properties of first-order term rewrite systems (TRSs). It has been in development since 2010 and has had many different contributors over the years. Its name is derived from the Confluence of the rivers Sill and Inn in Innsbruck. The tool is available from

<http://cl-informatik.uibk.ac.at/software/csi>

under a LGPLv3 license. A detailed description of CSI can be found in [4]. Some of the implemented techniques are described in [1,3,5]. CSI can also produce certificates for confluence results, which are checked by CēTA [2].

CSI participates in the TRS category of CoCo 2025 both as a standalone tool and in combination with CēTA providing certified confluence and non-confluence answers. In 2024 CSI won not only the TRS category, but also the NFP, SRS, UNC and UNR categories. Together with CēTA it came in second in the RELIABILITY category where tools are ranked based on the number of certifiable answers.

CSI uses the conversion tool<sup>1</sup> to transform ARI problems into COPS problems.

## References

- [1] Bertram Felgenhauer. Confluence for Term Rewriting: Theory and Automation. PhD thesis, University of Innsbruck, 2015.
- [2] Christina Kirk and René Thiemann. CoCo 2025 Participant: CēTA 3.6. In *Proc. 14th International Workshop on Confluence*, 2025. This volume.
- [3] Julian Nagele. Mechanizing Confluence: Automated and Certified Analysis of First- and Higher-Order Rewrite Systems. PhD thesis, University of Innsbruck, 2017.
- [4] Julian Nagele, Bertram Felgenhauer, and Aart Middeldorp. CSI: New Evidence – A Progress Report. In *Proc. 26th International Conference on Automated Deduction*, volume 10395 of *Lecture Notes in Artificial Intelligence*, pages 385–397, 2017. doi: [10.1007/978-3-319-63046-5\\_24](https://doi.org/10.1007/978-3-319-63046-5_24).
- [5] Harald Zankl. Challenges in Automation of Rewriting. Habilitation thesis, University of Innsbruck, 2014.

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<sup>1</sup><https://project-coco.uibk.ac.at/ARI/#conversion>