

# CoCo 2013 Participant: CSI\*

Harald Zankl    Bertram Felgenhauer    Aart Middeldorp  
Institute of Computer Science, University of Innsbruck, Austria

CSI is an automatic tool for (dis)proving confluence of first-order term rewrite systems (TRSs). Its name is derived from the Confluence of the rivers Sill and Inn in Innsbruck. The tool is open source and available from <http://cl-informatik.uibk.ac.at/software/csi>, where also a web interface is linked. CSI is based on the termination prover  $\Upsilon\Upsilon_2$ . The main features and at the same time the major attractions of CSI are listed below together with the year when each feature was added. Several of these are described in more detail in [7].

- 2012 CSI is equipped with a strategy language, which allows to configure it flexibly.
- 2012 CSI implements the decreasing diagrams technique in a modular way, where different labelings can be combined lexicographically to obtain decreasingness.
- 2012 CSI supports decomposing TRSs into smaller TRSs based on ordered sorts (subtypes).
- 2012 CSI features an efficient decision procedure for confluence of ground TRSs [2] that runs in cubic time in terms of the TRS size.
- 2012 Our non-confluence techniques employ methods from termination analysis, namely `tcap`, and tree automata techniques. For counterexamples to confluence we currently start with critical peaks. However, as shown in [3] this is not always sufficient, even for linear TRSs.
- 2012 CSI can produce proofs in `cpf` format that can be verified by certifiers like `CeTA` [6].
- 2013 The tree automata techniques for detecting non-confluence have been improved.
- 2013 We extended the modular decreasing diagrams implementation to optionally use parallel rewrite steps and critical pairs [4].

For his master's thesis, Benjamin Höller is currently working on implementing the techniques from [1] and [5] in CSI. This will improve the performance of CSI on non-left-linear, non-terminating TRSs dramatically. We hope to include the code into CSI for CoCo 2013.

## References

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