

# CoCo 2014 Participant: CSI 0.4.2\*

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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  $\mathbb{T}\mathbb{T}\mathbb{2}$ . 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 [9].

- 2012 CSI is equipped with a strategy language, which allows to configure it flexibly. CSI implements the decreasing diagrams technique in a modular way, where different labelings can be combined lexicographically to obtain decreasingness. CSI supports decomposing TRSs into smaller TRSs based on ordered sorts (subtypes). CSI features an efficient decision procedure for confluence of ground TRSs [2] that runs in cubic time in terms of the TRS size. 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. CSI can produce proofs in `cpf` format that can be verified by certifiers like `CeTA` [8].
- 2013 The tree automata techniques for non-confluence have been improved. We extended the modular decreasing diagrams implementation to optionally use parallel rewrite steps and critical pairs [4]. Benjamin Höller [6] implemented the techniques from [1] and [7].
- 2014 We implemented a redex based labeling and a refinement of rule labeling using persistence [10]. CSI produces certifiable output for tree automata based non-confluence [5].

## References

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