CoCo 2025 Participant: crest 1.0[*]

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The Constrained REwriting Software Tool (crest, for short) is a tool for automatically proving (non-)confluence of logically constrained rewrite systems (LCTRSs). The development of crest started in the beginning of 2023 as part of the ARI project[1] and initial experiments were presented at CADE-29 in 2023 [4]. More information and executables of crest can be found at

http://cl-informatik.uibk.ac.at/software/crest/

Currently, crest supports (non-)confluence [2, 4, 7] and limited (non-)termination analysis [2, 1]. The confluence methods mostly rely on closure properties of (parallel) critical pairs. In addition, we support two recent transformation techniques: splitting constrained critical pairs (CCPs) and merging constrained rewrite rules [5]. Furthermore, a constrained variant of the redundant rules technique [3] is implemented [6].

Our tool crest participates in the LCTRS category of CoCo 2025.

References

[1] Cynthia Kop. Termination of LCTRSs. *CoRR*, abs/1601.03206, 2016. doi: https://doi.org/10.48550/ARXIV.1601.03206.

[2] Cynthia Kop and Naoki Nishida. Term rewriting with logical constraints. In Pascal Fontaine, Christophe Ringeissen, and Renate A. Schmidt, editors, *Proc. 9th International Symposium on Frontiers of Combining Systems*, volume 8152 of *Lecture Notes in Artificial Intelligence*, pages 343–358, 2013. doi: https://doi.org/10.1007/978-3-642-40885-4_24.

[3] Julian Nagele, Bertram Felgenhauer, and Aart Middeldorp. Improving automatic confluence analysis of rewrite systems by redundant rules. In Maribel Fernández, editor, *Proc. 26th International Conference on Rewriting Techniques and Applications*, volume 36 of *Leibniz International Proceedings in Informatics*, pages 257–268, 2015.

[4] Jonas Schöpf and Aart Middeldorp. Confluence criteria for logically constrained rewrite systems. In Brigitte Pientka and Cesare Tinelli, editors, *Proc. 29th International Conference on Automated Deduction*, volume 14132 of *Lecture Notes in Artificial Intelligence*, pages 474–490, 2023. doi: https://doi.org/10.1007/978-3-031-38499-8_27.

[5] Jonas Schöpf and Aart Middeldorp. Automated analysis of logically constrained rewrite systems using crest. In Arie Gurfinkel and Marijn Heule, editors, *Proc. 31st International Conference on Tools and Algorithms for the Construction and Analysis of Systems*, volume 15696 of *Lecture Notes in Computer Science*, pages 124–144, 2025.

[6] Jonas Schöpf and Aart Middeldorp. Improving confluence analysis for LCTRSs. In *Proc. 14th International Workshop on Confluence*, 2025. This volume.

[7] Jonas Schöpf, Fabian Mitterwallner, and Aart Middeldorp. Confluence of logically constrained rewrite systems revisited. In Christoph Benzmüller, Marijn J.H. Heule, and Renate A. Schmidt, editors, *Proc. 12th International Joint Conference on Automated Reasoning*, volume 14740 of *Lecture Notes in Artificial Intelligence*, pages 298–316, 2024.