

CoCo 2024 Participant: FORT-h 2.1

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The first-order theory of rewriting is a decidable theory for finite left-linear right-ground rewrite systems. The decision procedure goes back to Dauchet and Tison [1]. FORT-h is a reimplementaion of the tool FORT [4], but is based on a new variant of the decision procedure, described in [2], for the larger class of linear variable-separated rewrite systems. This variant supports a more expressive theory and is based on anchored ground tree transducers. More importantly, it can produce certificates for the YES/NO answers. These certificates can then be verified by FORTify, an independent Haskell program that is code-generated from the formalization of the decision procedure in the proof assistant Isabelle/HOL.

A command-line version of FORT-h can be downloaded from

[http://fortissimo.uibk.ac.at/fort\(ify\)/](http://fortissimo.uibk.ac.at/fort(ify)/)

FORT-h participates in the following CoCo 2024 categories: COM, GCR, NFP, TRS, UNC, and UNR. In all six categories it additionally participates together with FORTify [3] to produce certified YES/NO answers. In 2023 FORT-h had the most YES answers in the UNR category. Moreover, it won the RELIABILITY¹ category.

FORT-h 2.1 accepts input problems in ARI² format.

References

- [1] Max Dauchet and Sophie Tison. The Theory of Ground Rewrite Systems is Decidable. In *Proc. 5th IEEE Symposium on Logic in Computer Science*, pages 242–248, 1990. doi: [10.1109/LICS.1990.113750](https://doi.org/10.1109/LICS.1990.113750).
- [2] Aart Middeldorp, Alexander Lochmann, and Fabian Mitterwallner. First-Order Theory of Rewriting for Linear Variable-Separated Rewrite Systems: Automation, Formalization, Certification. *Journal of Automated Reasoning*, 67(14):1–76, 2023. doi: [10.1007/s10817-023-09661-7](https://doi.org/10.1007/s10817-023-09661-7).
- [3] Fabian Mitterwallner and Aart Middeldorp. CoCo 2024 Participant: FORTify 2.0. In *Proc. 13th International Workshop on Confluence*, 2024. This volume.
- [4] Franziska Rapp and Aart Middeldorp. FORT 2.0. In *Proc. 9th International Joint Conference on Automated Reasoning*, volume 10900 of *LNCS (LNAI)*, pages 81–88, 2018. doi: [10.1007/978-3-319-94205-6_6](https://doi.org/10.1007/978-3-319-94205-6_6).

¹<https://project-coco.uibk.ac.at/2023/results.php#certification>

²<https://project-coco.uibk.ac.at/ARI/>