TermComp 2018 Participant: T$_T$T$_2$

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The *Tyrolean Termination Tool* (in its 2nd incarnation T$_T$T$_2$ [2]) is an automated tool for proving (and disproving) termination of term rewrite systems that is developed in the *Computational Logic* group at the University of Innsbruck in Austria.

`http://cl-informatik.uibk.ac.at/ttt2`

Besides various minor changes and improvements, the most notable addition to version v1.17 of T$_T$T$_2$ for this years termination competition is the following.

External Nonreachability Tools. We added an interface that supports external nonreachability tools to the edg processor that computes an *estimated dependency graph*. If such a tool is given, it is called for a potential edge, whenever the checks implemented in T$_T$T$_2$ could not prove nonreachability. The user can provide any program that takes a TRS on startup and individual nonreachability problems successively on standard input. Results are read from standard output, where the answer NO is interpreted as nonreachability and every other string as "don't know."

Related to this extension of T$_T$T$_2$, we developed nonreach, a tool for nonreachability analysis that comes with a collection of fast checks based on tcap [1] and the *symbol transition graph* [3]. Moreover, nonreach employs root-nonreachability checks—based on variations of these fast nonreachability checks—to decompose problems into a disjunction of smaller subproblems. Finally, nonreach makes use of narrowing to transform a problem into a conjunction of (potentially easier) problems. Taken together, we obtain a divide and conquer approach to check for nonreachability.

References

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2 Martin Korp, Christian Sternagel, Harald Zankl, and Aart Middeldorp. Tyrolean Termination Tool 2. In *Proceedings of the 20th International Conference on Rewriting Techniques and Applications (RTA)*, volume 5595 of *Lecture Notes in Computer Science*, pages 295–304. Springer, 2009. doi:10.1007/978-3-642-02348-4_21.

3 Akihisa Yamada. Reachability for termination. 4th Austria–Japan Summer Workshop on Term Rewriting (AJSW), 2016. http://cl-informatik.uibk.ac.at/users/ayamada/AJSW2016-slides.pdf.

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