

**Kochemazov, Stepan; Zaikin, Oleg**

**ALIAS: a modular tool for finding backdoors for SAT.** (English) [Zbl 06916320](#)

Beyersdorff, Olaf (ed.) et al., Theory and applications of satisfiability testing – SAT 2018. 21st international conference, SAT 2018, held as part of the Federated Logic Conference, FloC 2018, Oxford, UK, July 9–12, 2018. Proceedings. Cham: Springer (ISBN 978-3-319-94143-1/pbk; 978-3-319-94144-8/ebook). Lecture Notes in Computer Science 10929, 419-427 (2018).

Summary: We present ALIAS, a modular tool aimed at finding backdoors for hard SAT instances. Here by a backdoor for a specific SAT solver and SAT formula we mean a set of its variables, all possible instantiations of which lead to construction of a family of subformulas with the total solving time less than that for an original formula. For a particular backdoor, the tool uses the Monte-Carlo algorithm to estimate the runtime of a solver when partitioning an original problem via said backdoor. Thus, the problem of finding a backdoor is viewed as a black-box optimization problem. The tool's modular structure allows to employ state-of-the-art SAT solvers and black-box optimization heuristics. In practice, for a number of hard SAT instances, the tool made it possible to solve them much faster than using state-of-the-art multithreaded SAT-solvers.

For the entire collection see [\[Zbl 1390.68015\]](#).

**MSC:**

[68Q25](#) Analysis of algorithms and problem complexity

[68T20](#) Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)

**Software:**

[abcdSAT](#); [ALIAS](#) ; [PaInleSS](#); [Paramils](#); [Plingeling](#)

**Full Text:** [DOI](#)