

SLIME: A Minimal Heuristic to Boost SAT Solving

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Abstract—This is the system description of the SLIME SAT Solver submitted to the SAT Competition 2019, based in MapleL-CMDistChronoBT winner by PAR-2 Score of SAT Competition 2018 [1] on Main Track.

I. DESCRIPTION

On CDCL Based SAT Solvers the *trail* size is strictly related to progress or to the total conflicts on the current assignment, such that if the *trail* size is the same that the number of variables, then current assignment is valid.

On the other hand, in the selection of the current variable it is necessary to assign a predetermined polarity to the resulting literal, which in most implementations is a predefined value.

SLIME implement a simple heuristic with minimal complexity, that correlated the *trail* size and the polarity of the current variable to assign.

The selection of variable is not related to *trail* size, this decouple the both concepts.

Algorithm 1 Boost: Algorithm for Variable Selection.

Require: variable

Ensure: literal

```
polarity[variable] = !polarity[variable]
if size(trail) > global then
    global = size(trail)
else if size(trail) < global then
    polarity[variable] = !polarity[variable]
end if
return literal(variable, polarity[variable])
```

* The *global* is an external variable init to 0.

II. EXPERIMENTAL RESULTS

Thanks to www.starexec.org it could be possible to test the Boost Heuristics vs The Control Solver, in a real context, these are the results for SAT Race 2006 and SAT Race 2015 at 1800 seconds of wall with the PAR-2 score scheme. (The score of a solver is defined as the sum of all runtimes for solved instances + 2*timeout for unsolved instances, lowest score wins.)

ACKNOWLEDGMENT

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REFERENCES

- [1] M. Heule, M. Jarvisalo, and M. Suda. Sat competition 2018. <http://sat2018.forsyte.tuwien.ac.at>

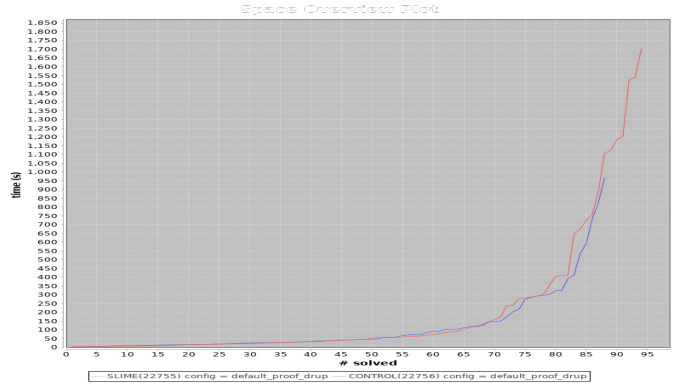


Fig. 1. SAT Race 2006 at 1800 seconds

TABLE I
SAT RACE 2006

	<i>SAT-VERIFIED</i>	<i>UNKNOWN</i>	<i>UNSAT</i>
CONTROL	39 / 6200.9036	12 / 21600.5500	49 / 4073.3146
SLIME	40 / 13636.2266	6 / 10800.2000	54 / 5925.2390

PAR-2 SCORE: SLIME-41161.8656 vs CONTROL-53475.3182

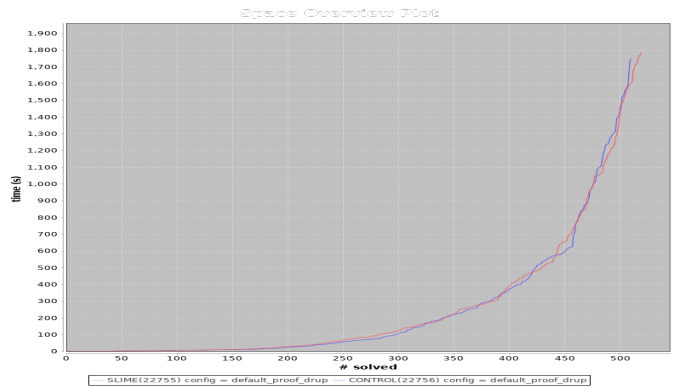


Fig. 2. SAT Race 2015 at 1800 seconds

TABLE II
SAT RACE 2015

	<i>SAT-VERIFIED</i>	<i>UNKNOWN</i>	<i>UNSAT</i>
CONTROL	337 / 75335.6121	141 / 253807.9600	173 / 45136.8643
SLIME	316 / 72936.3637	132 / 237606.6200	203 / 63956.2390

PAR-2 SCORE: SLIME-612105.8427 vs CONTROL-628088.3964