GLUEMINISAT 2.2.10-81

Hidetomo Nabeshima
University of Yamanashi, JAPAN

Koji Iwanuma
University of Yamanashi, JAPAN

Katsumi Inoue
National Institute of Informatics, JAPAN

***Abstract*—GLUEMINISAT 2.2.10-81 is a SAT solver based on MINISAT 2.2 and the LBD evaluation criteria of learned clauses. New features of 2.2.10-81 are an inprocessing technique based on at-most-one constraints and the support of the UNSAT certification in binary DRAT format.**

I. INTRODUCTION

GLUEMINISAT is a SAT solver based on MINISAT 2.2 [1] and the LBD evaluation criteria of learned clauses [2]. One of the feature of GLUEMINISAT is the on-the-fly lazy simplification techniques based on binary resolvents [3], which are inprocessing techniques and are executed frequently during the search process of the satisfiability checking. These techniques try to identify the truth value of variables and to detect equivalent literals, and to simplify (learned) clauses by binary self-subsuming resolution. These were introduced from 2.2.7 and some of them are refined and extended in 2.2.10.

The version 2.2.10 was submitted to SAT Race 2015 [4]. New features of 2.2.10-81 are an inprocessing technique based on at-most-one constraints and the support of the UNSAT certification in binary DRAT format.

II. MAIN TECHNIQUES

A feature of 2.2.10-81 is a simplification technique based on at-most-one constraints which are automatically extracted by two ways. First is the extraction of pairwise encoding of at-most-one constraints. This extraction is executed at the end of preprocessing with the help of an efficient maximal clique enumerator called MACE [5]. Second is the semantic extraction based on binary resolvents and executed periodically during solving. For example, if we have $l_1 + l_2 + l_3 \leq 1$ and the binary implications $\forall i(\neg l_4 \rightarrow l_i)$ are detected in the process of unit propagations, then we can extend it to $l_1 + l_2 + l_3 + l_4 \leq 1$. The extracted at-most-one constraints are used for the identification of the truth value of variables. For example, if we have $l_1 + l_2 + l3 + l4 \leq 1$ and the binary resolvent $l_1 \vee l_2$ is detected, then $l_3 = l_4 =$ *false* holds.

III. SAT COMPETITION 2016 SPECIFICS

GLUEMINISAT 2.2.10-81 is submitted to Main, Agile and No-limits tracks.

- **Main track**: To reduce the generation and verification cost of UNSAT proof, every lazy simplification techniques [3] and the simplification technique based on at-most-one constraints are disabled.
- **Agile track**: The incremental variable elimination [4] and the simplification technique based on at-most-one constraints are disabled since sometimes these take time compared with other simplification techniques.
- **No-limits track**: Every techniques are enabled.

IV. AVAILABILITY

GLUEMINISAT is developed based on MINISAT 2.2. Permissions and copyrights of GLUEMINISAT are exactly the same as MINISAT. GLUEMINISAT can be downloaded at http://glueminisat.nabelab.org/. MACE is available for only academic use and refer [5] for details.

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