Abstract—This document describes the hybrid SAT solver “DCCASatToRiss”, which is combination of a local search solver and a complete solver.

I. INTRODUCTION

Recently, we proposed a local search strategy, named configuration checking (CC), which contributes to the diversification. The CC strategy is first used in the context of minimum vertex cover solving [1], [2], [3], [4]. As CC is a general idea, it has been successfully applied in the Boolean satisfiability (SAT) problem [5], [6], [7], [8], [9], [10], [11], [12], [13], [14] and the maximum satisfiability (MAX-SAT) problem [15], [16].

In the context of SAT, there are two different CC strategies, i.e., neighboring variables based configuration checking (NVCC) [10] and clause states based configuration checking (CSCC) [14]. On the basis of the CCASat solver [10] which is the winner of random SAT track in SAT Challenge 2012, by combining NVCC and CSCC, we developed a local search solver called DCCASat [11]. As the performance of local search solvers is complementary to the performance of complete solvers on solving hard-combinatorial SAT instances, we combine DCCASat with a complete solver. Inspired by the success of the SparrowToRiss solver [17], [18], which combines a local search solver Sparrow [19] with a complete solver Riss3g [20] and a preprocessor CP3 [21], by replacing Sparrow with DCCASat, we obtain the resulting hybrid solver named DCCASatToRiss. We would like to note that the DCCASatToRiss solver has been presented in the literature [11].

II. MAIN TECHNIQUES

The DCCASatToRiss solver is a combination of the preprocessor CP3, the local search solver DCCASat and the complete solver Riss3g.

The main procedures of DCCASatToRiss can be described as follows. For solving an SAT instance, the DCCASatToRiss solver first employs CP3 to simplify the instance, and then it calls the local search solver DCCASat to solve the resulting simplified instance with $t$ search steps. If the instance is solved by DCCASat with $t$ search steps, then DCCASatToRiss reports the solution which is found by DCCASat; otherwise, DCCASatToRiss utilizes the complete solver Riss3g as well as some information obtained by DCCASat to solve the resulting simplified instance, and reports the solution if the instance is solved by Riss3g.

III. MAIN PARAMETERS

The parameter $t$ is set to 500,000,000 in SAT Race 2015. The parameters used in the current version of DCCASat in DCCASatToRiss are the same as the ones reported in the literature [11], inspired by the literature [22]. The parameters used in the current version of CP3 and Riss3g in DCCASatToRiss are the same as the ones in the literature [17].

IV. IMPLEMENTATION DETAILS

The DCCASatToRiss solver is implemented in programming language C++.

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