

Peer Review

Review of: "An Approximated QUBO Formulation for Solving Practical SAT Problems"

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The reviewer would like to thank the author for addressing the comments of the previous revision. Especially, the example in Section 2 is very well crafted. Additional comments on the first revision can be found below.

Abstract: "does not correspond to the solution of the SAT instance" -- It is okay to write here that it is not guaranteed to always correspond to the solution of the SAT instance, unless you know that 100% it will not.

Abstract: "exact solutions of PHP instances using our method, despite its approximate formalization" -- Since you write here that indeed, you might be lucky to recover the exact solution, one should write earlier in the abstract that the ground state of the QUBO is not guaranteed to map to the SAT, otherwise you have a contradiction here.

Page 1, left column: "Satisfiability problems (SAT) are the most basic NP-complete problems" -- It is unclear what most basic means; e.g., number partitioning (<https://arxiv.org/abs/1302.5843>) also has a pretty simple QUBO formulation.

Page 1, right column: "using the Ising model and QUBO formulations" -- The notion of an Ising model has not been introduced.

Page 2, left column: "In this paper, we introduce a simple formalization method to convert (general) SAT instances into QUBO instances." -- The way you write this, it implies that the conversion is always exact, which is not true.

Page 2, left column: "In contrast, existing QUBO formulations for 3SAT instances often necessitate" -- Well, that is not a surprise given they are exact. You are solving a different task, so it is unfair to claim that the auxiliary variables needed by the other methods is a drawback of those methods.

Page 3, right column: "resulting in 40 instances" -- There is a "." missing.

Page 3, right column: "The following two constraints are encoded as a set of clauses." -- I would use a colon ":".

Page 4, left column: "The following three constraints are encoded as a set of clauses." -- Same here, I would use a colon ":".

Page 4, left column: "adjacent vertices must have different colors" -- A full stop "." is missing at the end of the bullet point.

Page 5, left column: "the Chancellor and Nusslein methods achieved approximately 10%" -- One should write here that this measure refers to the unsat ratio, and also define this metric in the text since not all readers are familiar with the metrics you consider to measure the quality of the methods.

Declarations

Potential competing interests: No potential competing interests to declare.