

# Review of: "SAT is as hard as solving Homogeneous Diophantine Equation of Degree Two"

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The paper presents the NP-completeness of solving a homogeneous Diophantine equation of degree two when the variables are restricted to values 0 and 1. The provided proofs are technically sound and well-written, although they lack complex ideas and are rather straightforward.

It is noted that homogeneous Diophantine equations of degree two (HDE2) are considered easier to solve than general Diophantine equations. However, the relationship between 0-1 HDE2 and HDE2 is not explicitly discussed. It would be beneficial to clarify whether the algebraic techniques used to solve HDE2 can also be applied to solve 0-1 HDE2. Without such clarification, there is a risk that these two problems may be loosely related or have distinct solution approaches.

Furthermore, the paper asserts that the problem remains NP-complete when extended with an integer parameter  $M > 0$ , where the variables can only take integral values ranging from 0 to  $M-1$ . However, this claim is obvious since setting  $M=2$  would result in 0-1 HDE2. In my opinion, this extension does not bring anything new. Instead, it would be more valuable to investigate and determine the complexity of the problem for fixed values of  $M$  greater than 2.