

# An Introduction to Quantum Computing with SAT

Francesco Piro

March 10, 2020

## Abstract

This is the paper I have produced during my study of quantum computing for solving the SAT problem

- 1 Introduction**
- 2 Quantum Computing**
  - 2.1 Grover's Algorithm**
- 3 Computational Theory**
  - 3.1 SAT Problem**
- 4 SAT Implementation**
  - 4.1 Classical**
  - 4.2 Quantum**
  - 4.3 Classical vs. Quantum**
- 5 Conclusions**

## References

- [1] Scott Aaronson. Np-complete problems and physical reality. 2005.
- [2] Stephen A. Cook. The complexity of theorem-proving procedures. 1971.
- [3] V. Kreinovich E. Dantsin and A. Wolpert. On quantum versions of record-breaking algorithms for sat. 2005.
- [4] Richard P. Feynman. Quantum mechanical computers. 1986.
- [5] Lov K. Grover. A fast quantum mechanical algorithm for database search. 1996.
- [6] T. Hertli and R. A. Moser. Improving ppsz for 3-sat using critical variables. 2018.
- [7] S. Tamaki K. Makino and M. Yamamoto. Derandomizing hssw algorithm for 3-sat. 2011.
- [8] K. Kutzkov and D. Scheder. *Using Constraint Satisfaction To Improve Deterministic 3-SAT*. 2018.
- [9] Giacomo Nannicini. An introduction to quantum computing, without the physics. 2020.
- [10] K. Y. Chwa O. Cheong and K. Park. *Algorithms and Computations*. Springer, 2010.
- [11] M. Ohya and N. Masuda. Np problem in quantum algorithm. 2018.
- [12] M. Ohya and Igor V. Volovich. New quantum algorithm for studying np-complete problems. 2018.