Complexity of the Quantum Adiabatic Algorithm ITAY
HEN, A.P. YOUNG, University of California Santa Cruz — The Quantum Adiabatic Algorithm (QAA) has been proposed as a mechanism for
efficiently solving optimization problems on a quantum computer. Here,
we determine its efficiency by considering several constraint satisfaction
(SAT) problems. We do this by studying the size dependence of their
typical minimum energy gap using quantum Monte Carlo methods. We
find that for most problems this gap decreases exponentially with the
size of the problem, indicating that the QAA is not more efficient than
existing classical search algorithms. However, for one specific problem,
namely, MAX-2-XORSAT, there is evidence to suggest that the gap may
be polynomial near the phase transition.

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