



QUANTUM COMPUTATIONS BY ADIABATIC AND SUPERADIABATIC PROBABILISTIC CONTROLLED EVOLUTIONS

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ABSTRACT

There are certain tasks that quantum computers outperformed present day digital computers. Quantum computers are based on quantum physics. Potential commercial applications include cybersecurity, advanced manufacturing, pharmaceuticals, banking, and finance. Quantum gates that act on qubits are pivotal for quantum computations. We introduce a model of computation based on adiabatic/superadiabatic evolution and post-selection measurement on an auxiliary qubit. In both cases, adiabatic and superadiabatic, the probabilistic model allows for optimizing the thermodynamics cost for implementing gates. When the system reservoir interaction is taken into account, we show that the superadiabatic probabilistic model is more robust than the adiabatic one.

