1046-65-569   **Dianne P. O'Leary*** (`oleary@cs.umd.edu`), Computer Science Department, University of Maryland, College Park, MD 20742. *A Noisy Adiabatic Theorem and Implications for Quantum Computing.*

Quantum computing has the potential to solve numerical problems that are intractable using conventional computing. A brief introduction to quantum computing reveals that such systems are governed by Schrödinger's equation. The adiabatic theorem gives conditions that guarantee that such a system remains in its ground state when started in its ground state and evolved slowly. Realistically, such systems are subject to perturbations in the initial condition, systematic time-dependent perturbations in the Hamiltonian, coupling to low-energy quantum systems, and decoherent time-dependent perturbations in the Hamiltonian. Using Wilkinson-style perturbation analysis, we obtain bounds on the effects of these perturbations. This is joint work with Michael J. O'Hara. (Received September 08, 2008)