Adiabatic quantum computation and stoquastic Hamiltonians

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We discuss several results concerning the power of stoquastic Hamiltonians, i.e. Hamiltonians which avoid the sign-problem. We prove that any adiabatic quantum computation with stoquastic frustration-free Hamiltonians can be simulated classically efficiently, thus showing that there is no additional quantum power in such algorithms We leave open the question how to classically simulate adiabatic quantum computation with stoquastic Hamiltonian (of which quantum simulated annealing is an example), but provide indirect evidence that the complexity of stoquastic Hamiltonians is entirely "classical".

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