Approximate Fermionic Hamiltonian Simulation for H-chains

Introduction

One of the most promising applications of quantum computing is in the field of quantum computational chemistry, which aims to efficiently simulate the behavior (i.e. Hamiltonian evolution) of chemical systems that are too complex for classical computers. The ability to computationally predict behavior of molecular systems would significantly benefit drug discovery efforts. This paper presents a sub-quadratic (in n) quantum algorithm to simulate the Hamiltonian evolution of the hydrogen chain, a benchmark chemical system in this field.

Background