In this thesis we summarize the principles of quantum computing.
We specifically consider adiabatic quantum computing, whose principles are explained and shown on several examples.
To explain the principle of adiabatic quantum computing we review the adiabatic theorem.
We also outline possibility of using a particular Hamiltonian by Berry, which enables us to evolve system adiabatically in arbitrarily short time.
In the final part of this thesis, we explain the concept of quantum phase transitions. We discuss a relationship between quantum phase transitions and adiabatic quantum computing and show that adiabatic quantum computing scales polynomially with the number of qubits only for quantum phase transitions of second or higher order.