Computational Quantum Physics

Week 7

Due on week 8

Exercise 1: **Time-dependent Schrödinger equation**

Given a time-dependent one-dimensional quantum harmonic oscillator defined by the Hamiltonian

$$H = \frac{\hat{p}^2}{2} + \frac{(\hat{q} - q_0(t))^2}{2};$$

with $q_0(t) = t/T$ and $t \in [0 : T]$. Given $|\psi_0\rangle = |n = 0\rangle$ (ground state of the Harmonic oscillator), compute $|\psi(t)\rangle$ for different values of T.

If I move the potential SLOWLY (ADIABATICALY), the particle will move with the potential and "remain in the ground state"

If I move it QUICKLY the particle will escape...