習題一

1. For the ground state of a quantum simple harmonic motion, the eigenfunction can be written as . Plug it into the time-independent Schrodinger Equation

to verify that it does satisfy the equation and find eigenvalue .

1. To calculate observable results, we need to change the length unit back by and choose the constant by normalization condition:

The final ground state eigenfunction is:

For the ground state,

1. calculate the expectation values The result is so simple that it does not need a integration but please give a reason for your result,
2. ,

Hint:

1. .

Hint: Instead of doing the integration, you can simply use the formula .