Report for falling

Simulated with: lib.managers.crankNicolson.dimensionless

Simulation constants:

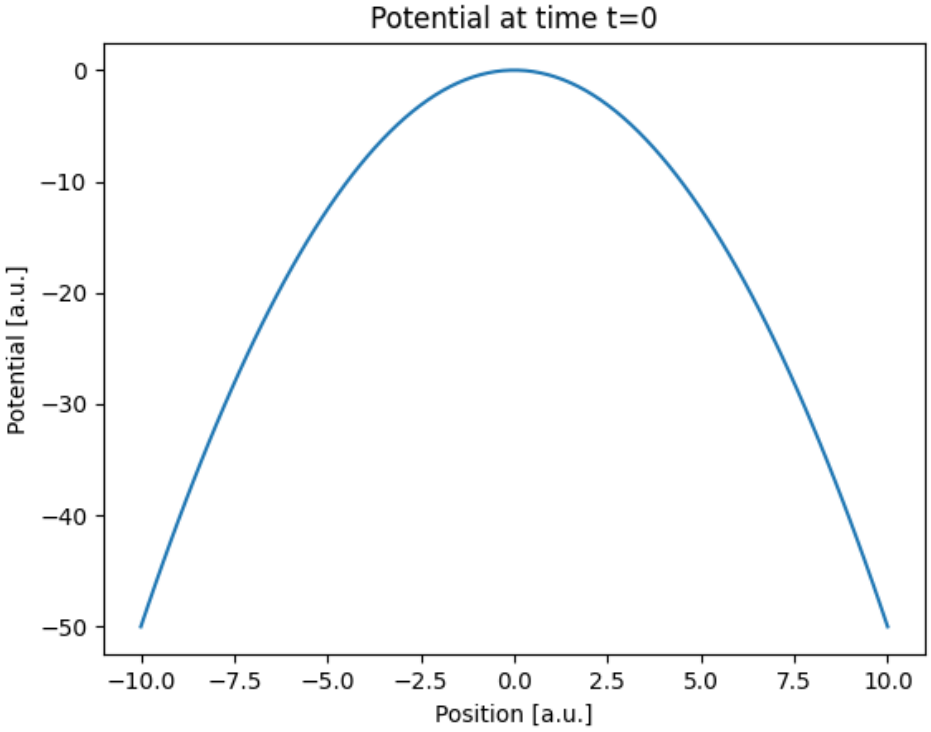
```
baseDensity: 1.000          chemicalPotential: 1.000    dt: 0.005

dx: 0.200                   g: -1.000                   hbar: 1.000

healingLength: 0.707        mass: 1.000                 plotFPS: 1000.000

plotPause: 0.001            plotStep: 10                plotYMax: 2

plotYMin: -2                r: 0.125                    tCount: 1000

tMax: 5                     tMin: 0                     velocity: 0.000

x0: -1.000                  xCount: 100                 xMax: 10

xMin: -10
```

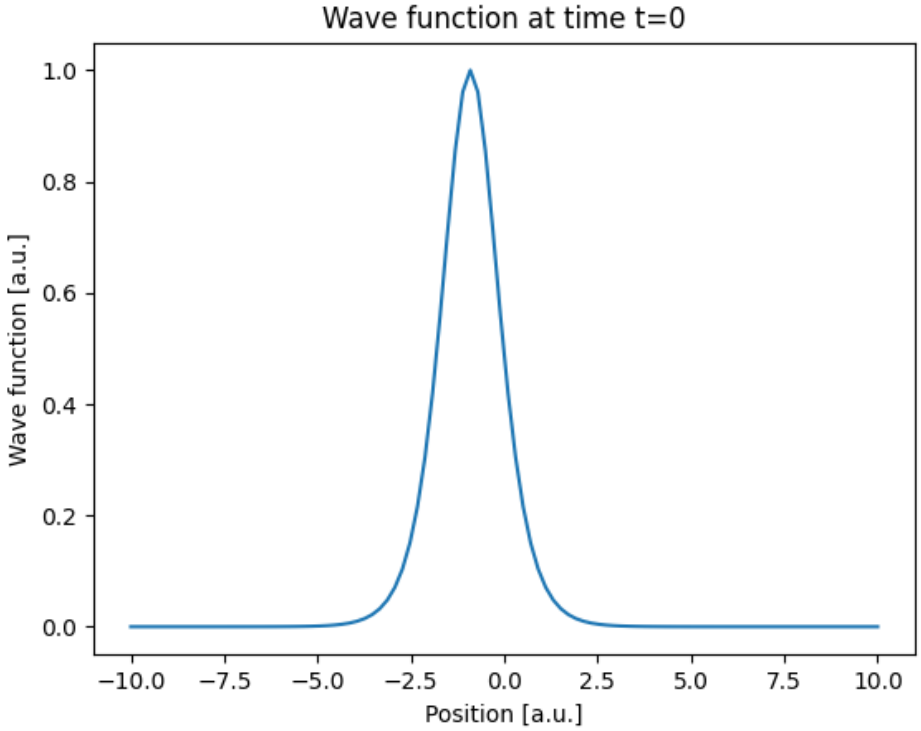
Wave function:

```
def brightSoliton(x, t, constants):     v = constants["velocity"]     g =

constants["g"]     x0 = constants["x0"]      eta = jnp.sqrt((v**2 + 2) / (-2 *

g))     kappa = jnp.sqrt(2 / (v**2 + 2))      spacePart = eta / jnp.cosh(((x -

x0) - v * t) / kappa) * jnp.exp(1j * (x - x0) * v)     timePart = jnp.exp(1j *

(1 / 2 - v**2 / 4) * t)      return spacePart * timePart
```

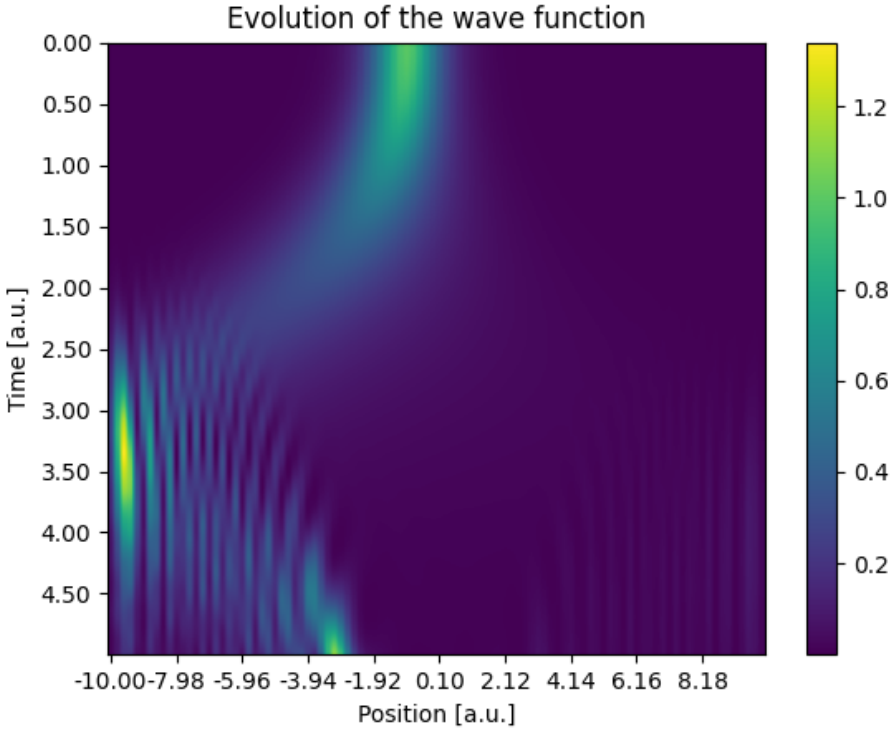
Potential function:

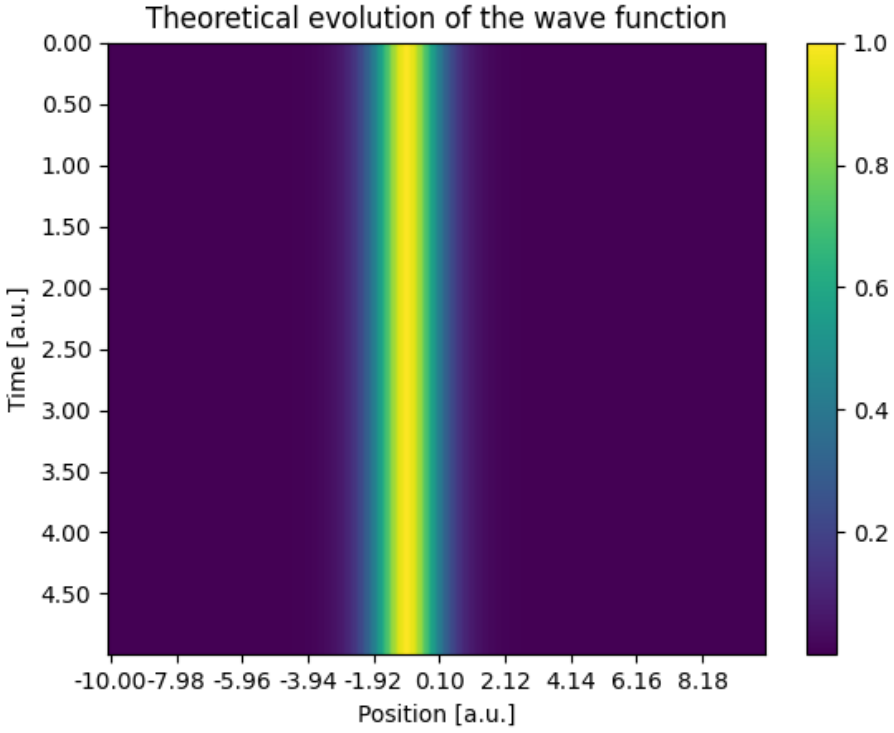
```
def V(x, t, constants):     return -1 / 2 * x**2
```

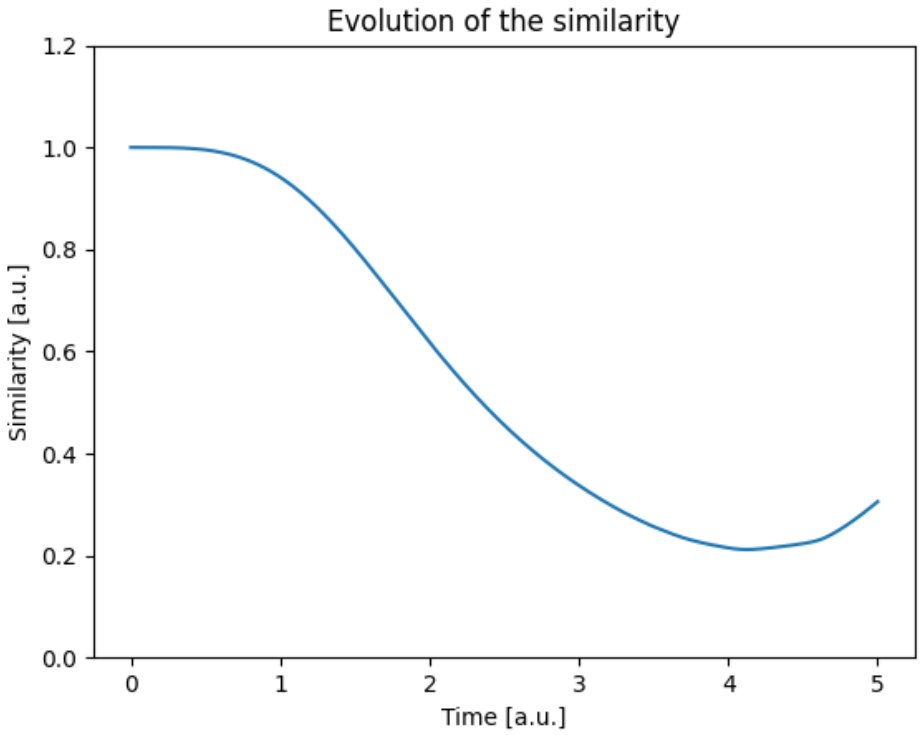

Potential at time t=0
Potential [a.u.]
0
−10
−20
−30
−40
−50
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
Position [a.u.]

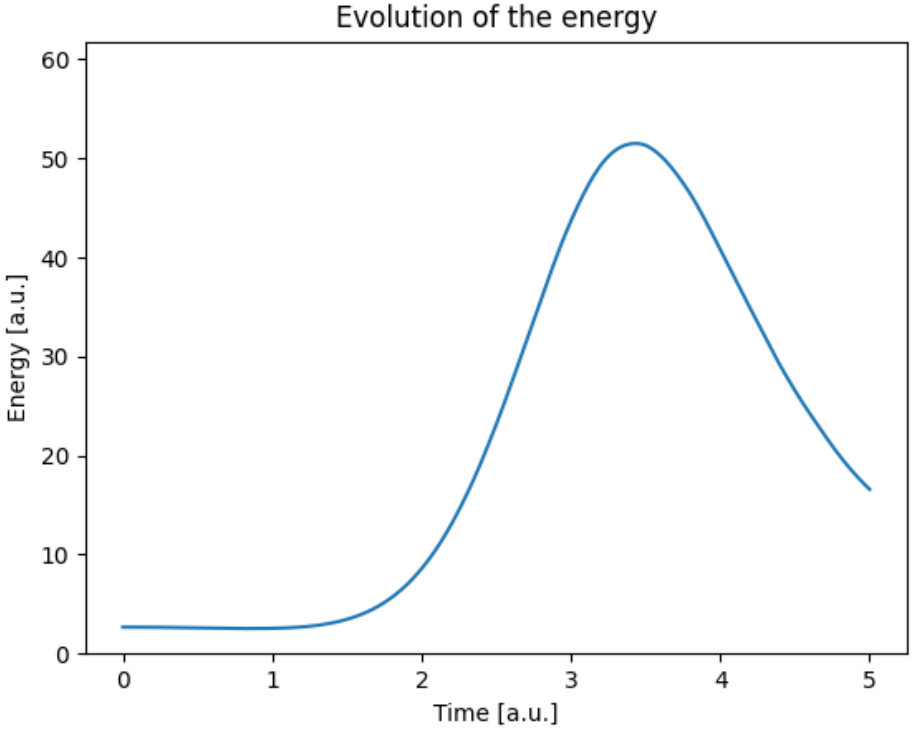

Wave function at time t=0
Wave function [a.u.]
1.0
0.8
0.6
0.4
0.2
0.0
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
Position [a.u.]

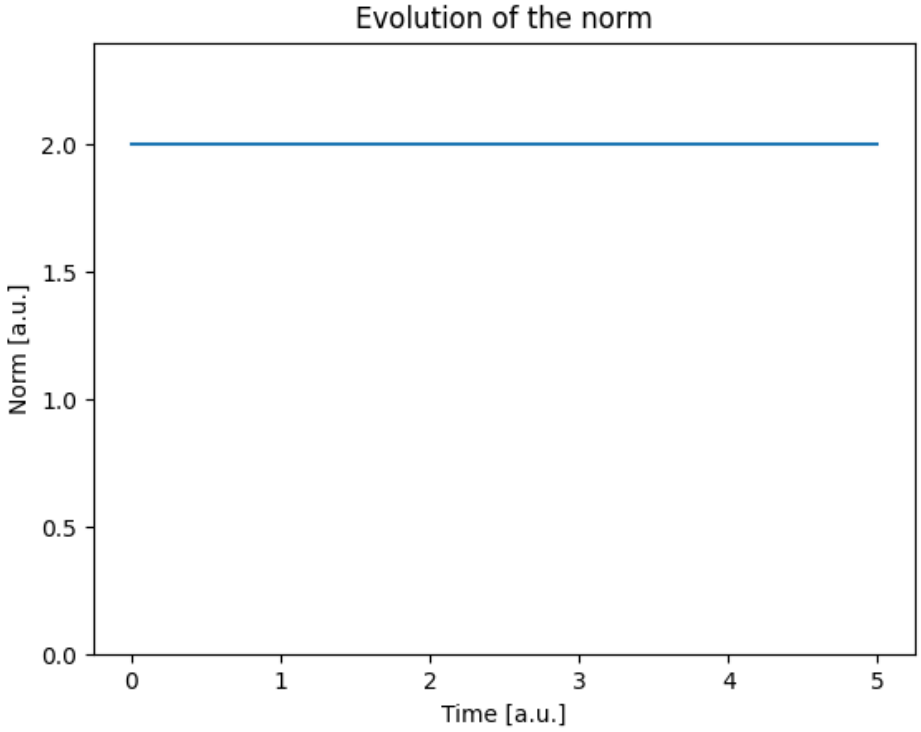
Results


Evolution of the wave function
Time [a.u.]
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
-10.00 -7.98 -5.96 -3.94 -1.92 0.10 2.12 4.14 6.16 8.18
Position [a.u.]
1.2
1.0
0.8
0.6
0.4
0.2


Theoretical evolution of the wave function
Time [a.u.]
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
-10.00 -7.98 -5.96 -3.94 -1.92 0.10 2.12 4.14 6.16 8.18
Position [a.u.]
1.0
0.8
0.6
0.4
0.2


Evolution of the similarity
Similarity [a.u.]
Time [a.u.]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
1
2
3
4
5


Evolution of the energy
Energy [a.u.]
Time [a.u.]
0
10
20
30
40
50
60
0
1
2
3
4
5


Evolution of the norm
Norm [a.u.]
Time [a.u.]
0.0
0.5
1.0
1.5
2.0
0
1
2
3
4
5