Report for movingFreeSoliton

Simulated with: lib.managers.crankNicolson.dimensionless

Simulation constants:

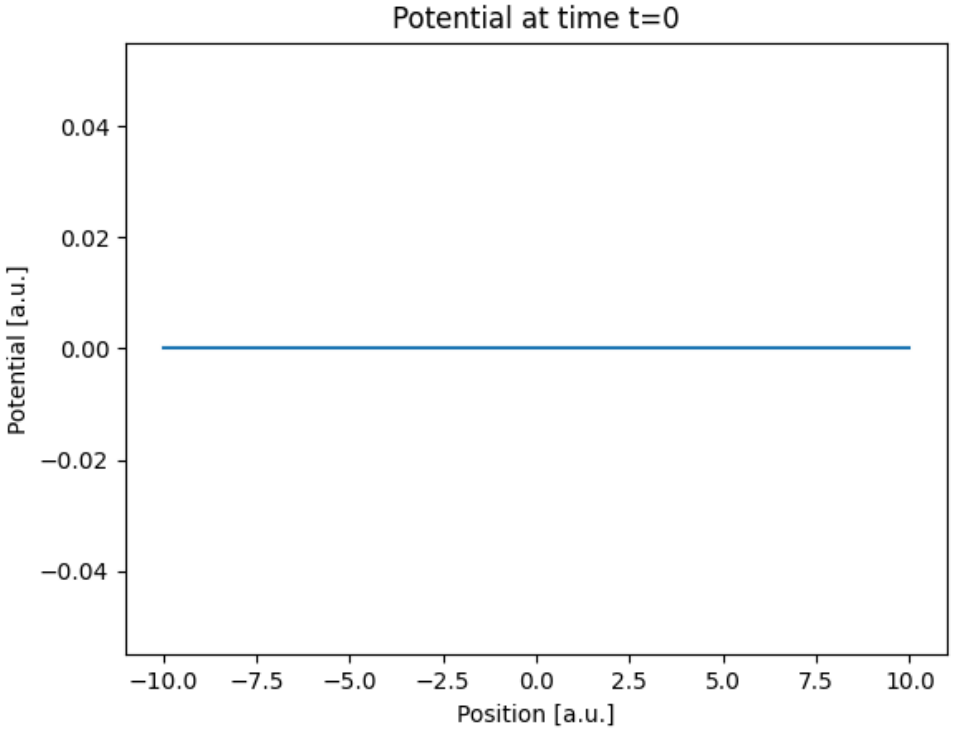
```
baseDensity: 1.000          chemicalPotential: 0.010    dt: 0.005

dx: 0.200                   g: -0.010                   hbar: 1.000

healingLength: 7.071        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: 1.000

x0: 0.000                   xCount: 100                 xMax: 10

xMin: -10
```

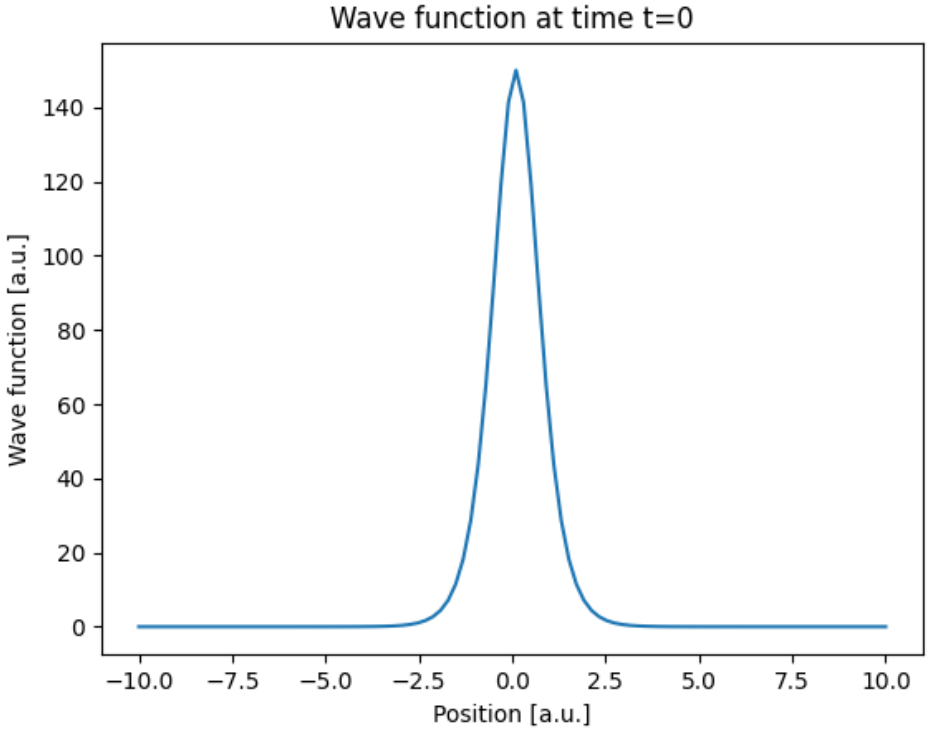
Wave function:

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

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

/ (v**2 + 2))      spacePart = eta / jnp.cosh((x - v * t) / kappa) * jnp.exp(1j

* x * v)     timePart = jnp.exp(1j * (1 / 2 - v**2 / 4) * t)      return

spacePart * timePart
```

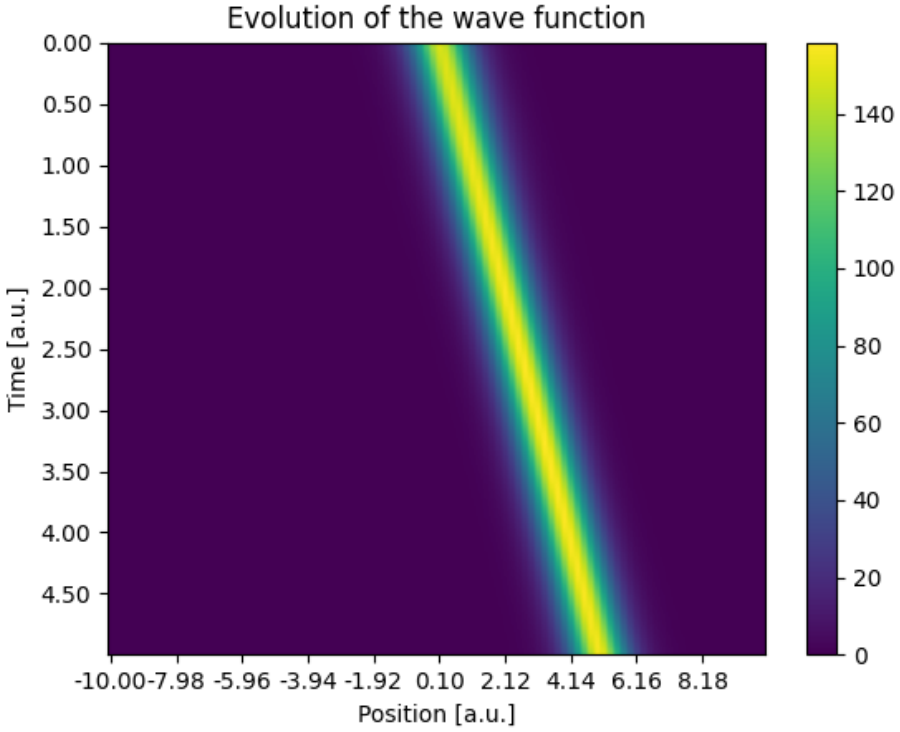
Potential function:

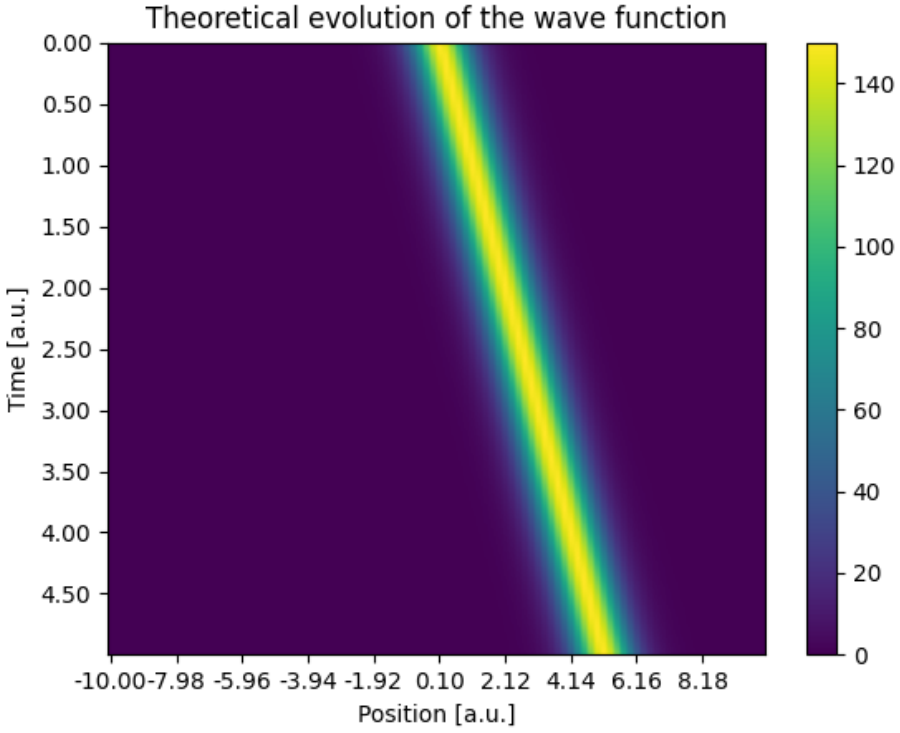
```
def V(x, t, constants):     return jnp.zeros_like(x)
```

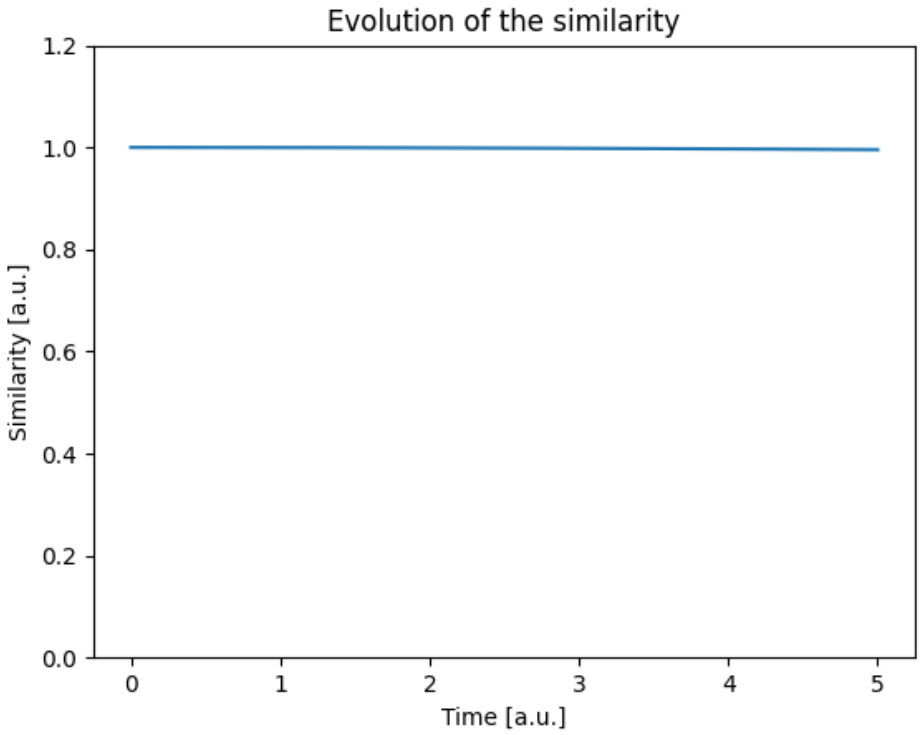

Potential at time t=0
Potential [a.u.]
0.04
0.02
0.00
−0.02
−0.04
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
Position [a.u.]

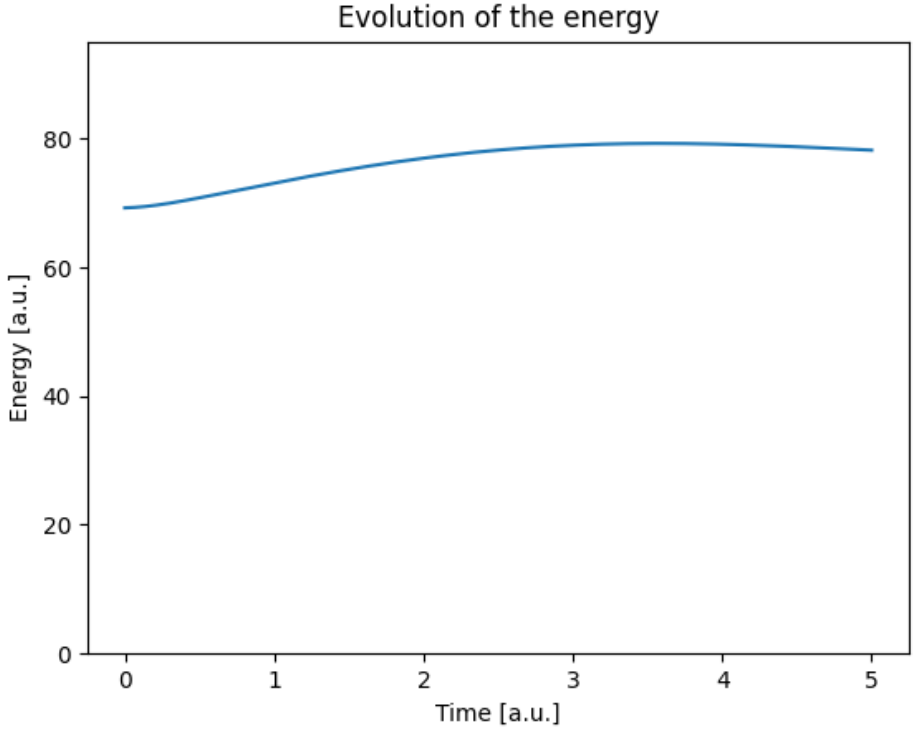

Wave function at time t=0
Wave function [a.u.]
140
120
100
80
60
40
20
0
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
Position [a.u.]

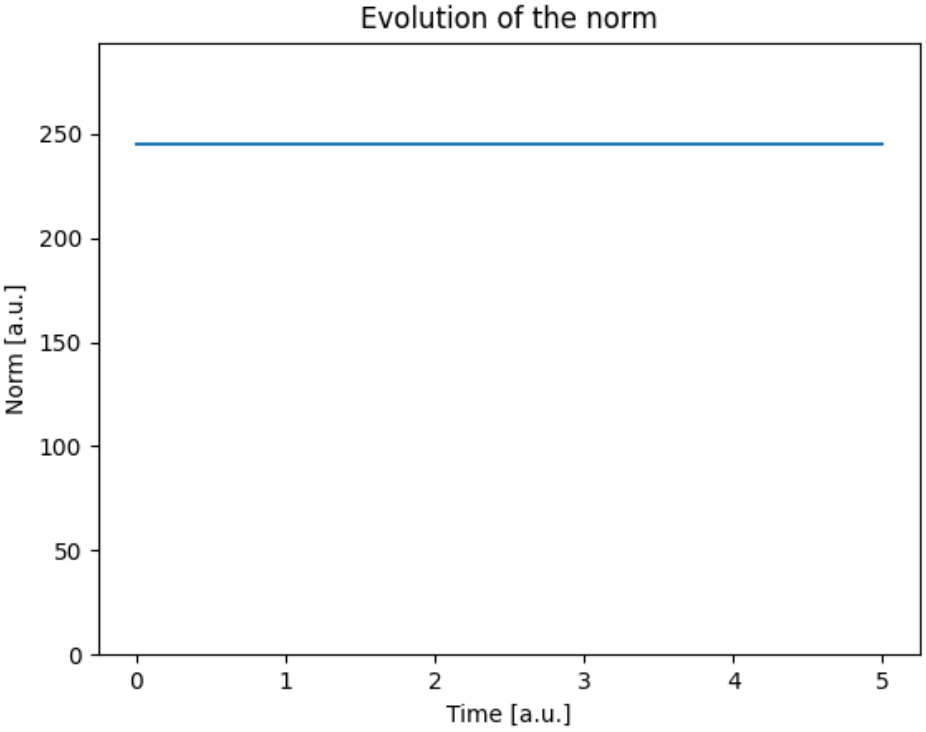
Results


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.]
140
120
100
80
60
40
20
0


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.]
140
120
100
80
60
40
20
0


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
20
40
60
80
0
1
2
3
4
5


Evolution of the norm
Norm [a.u.]
Time [a.u.]
0
50
100
150
200
250
0
1
2
3
4
5