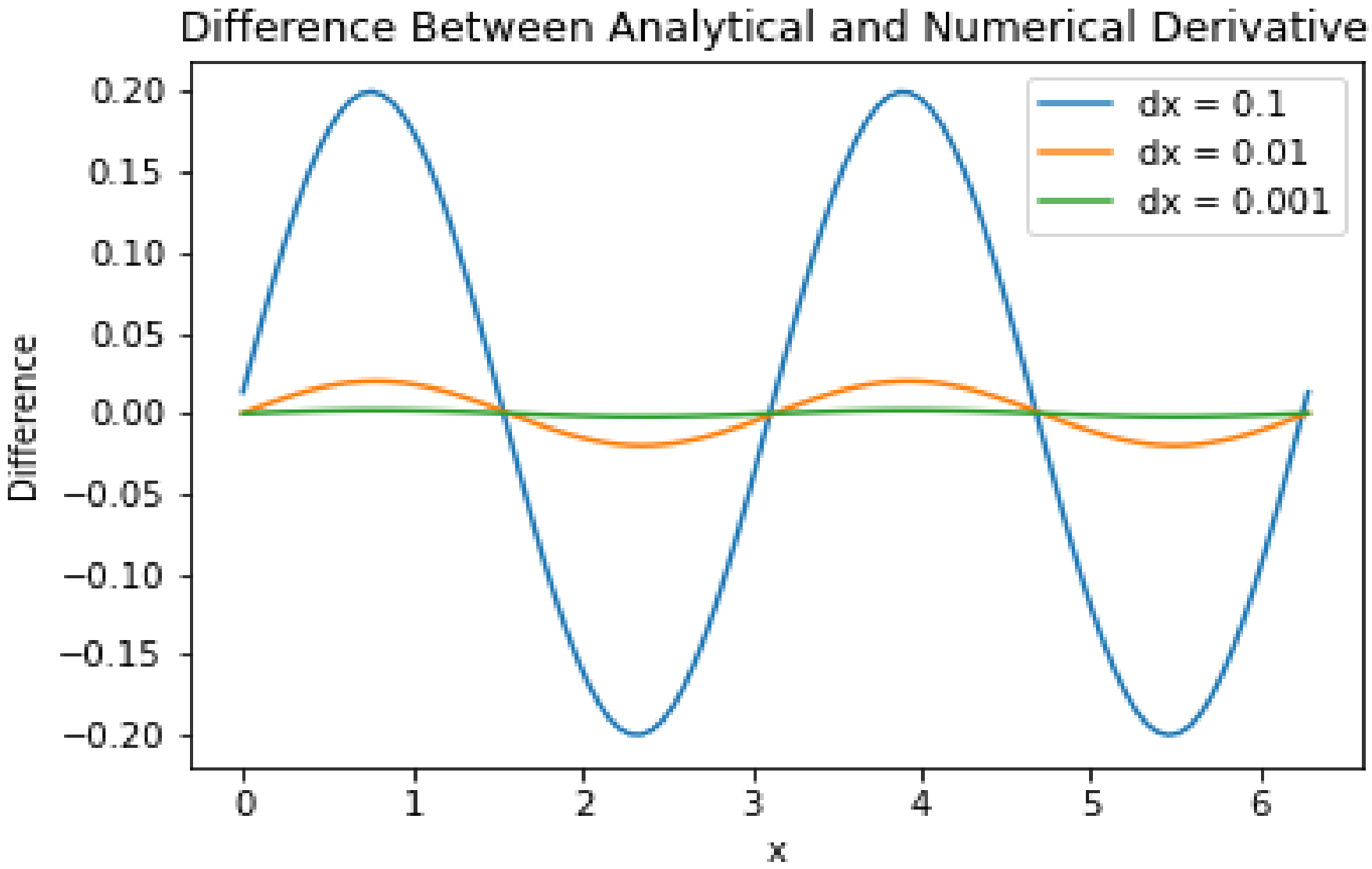
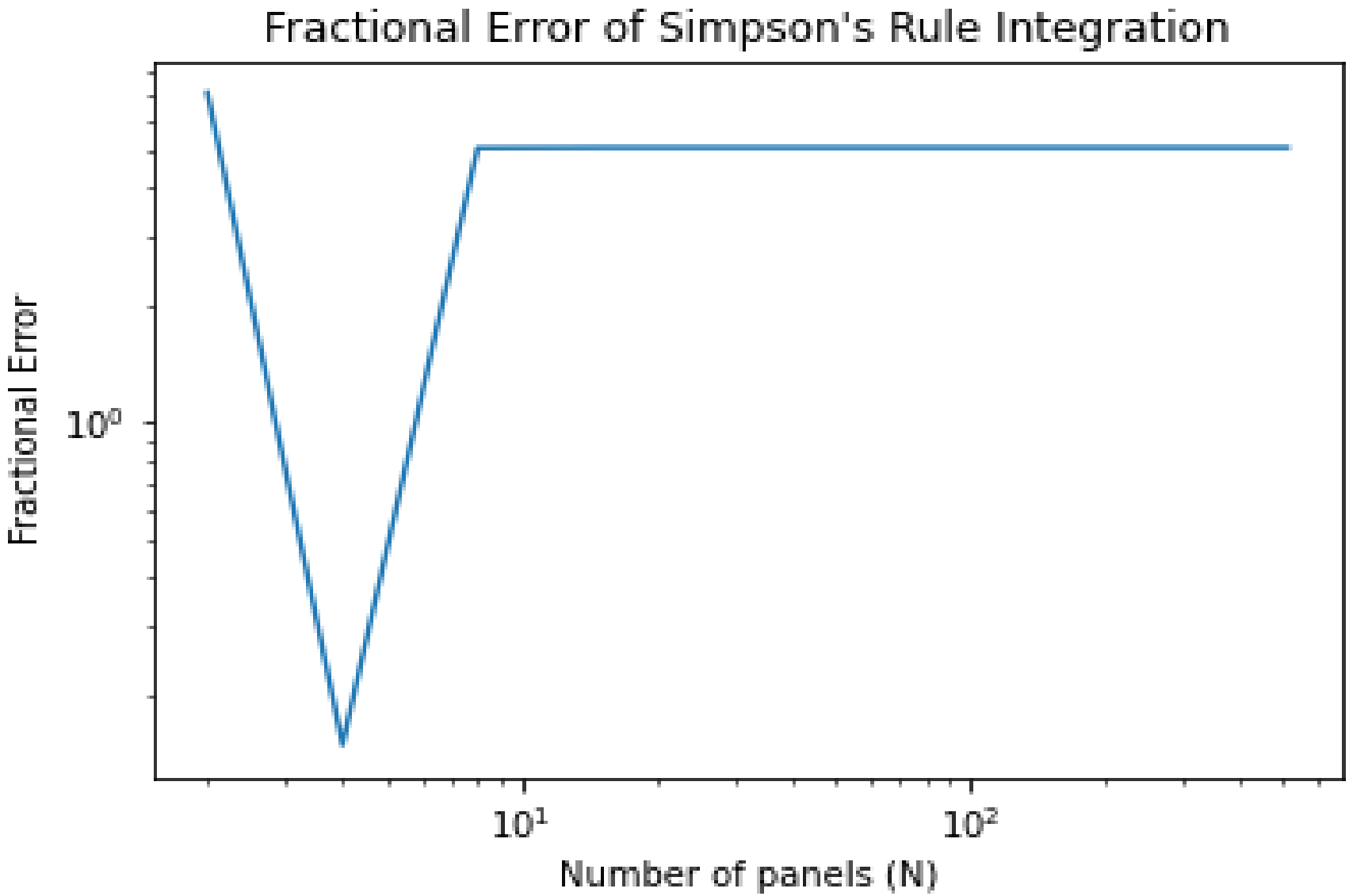
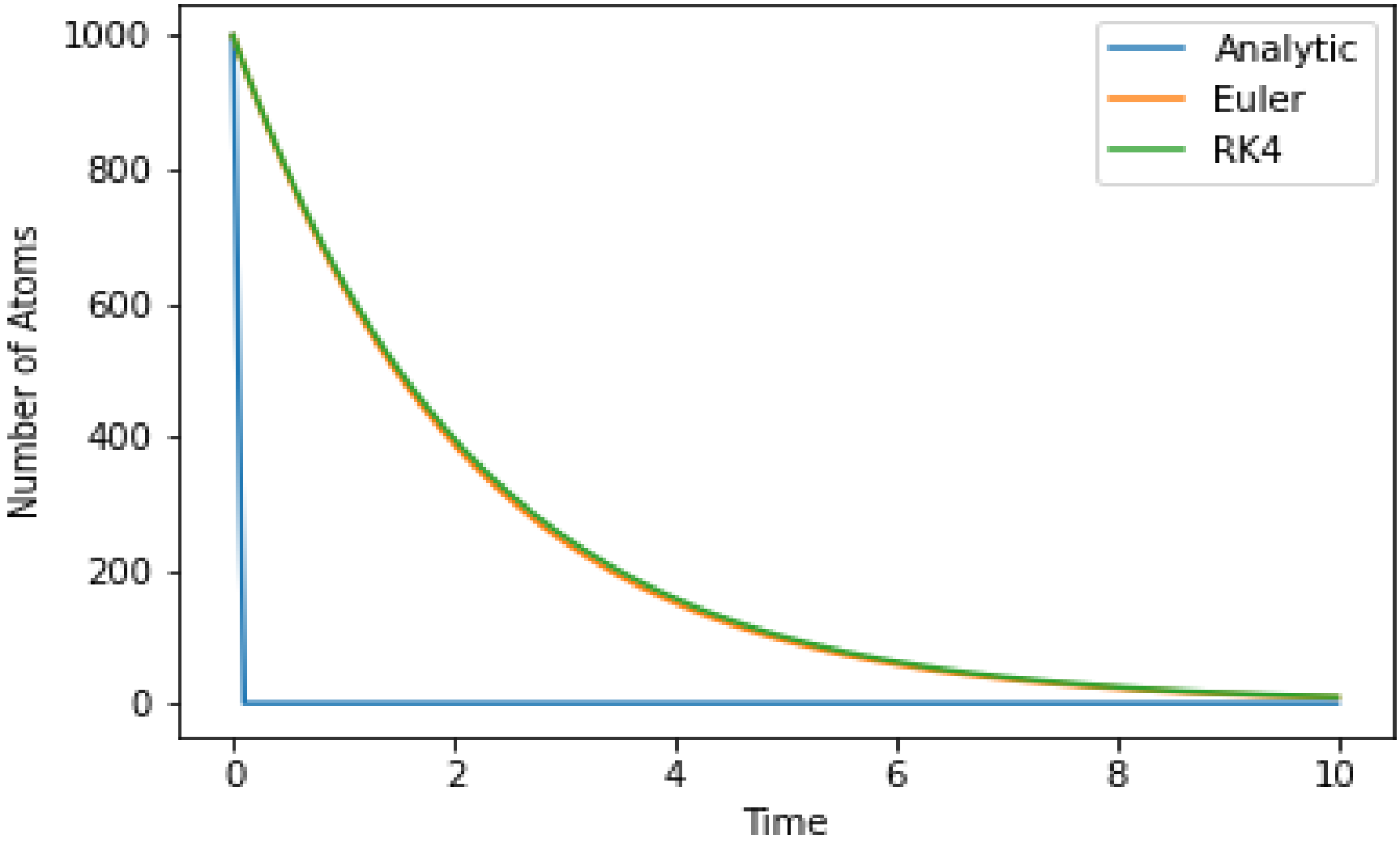
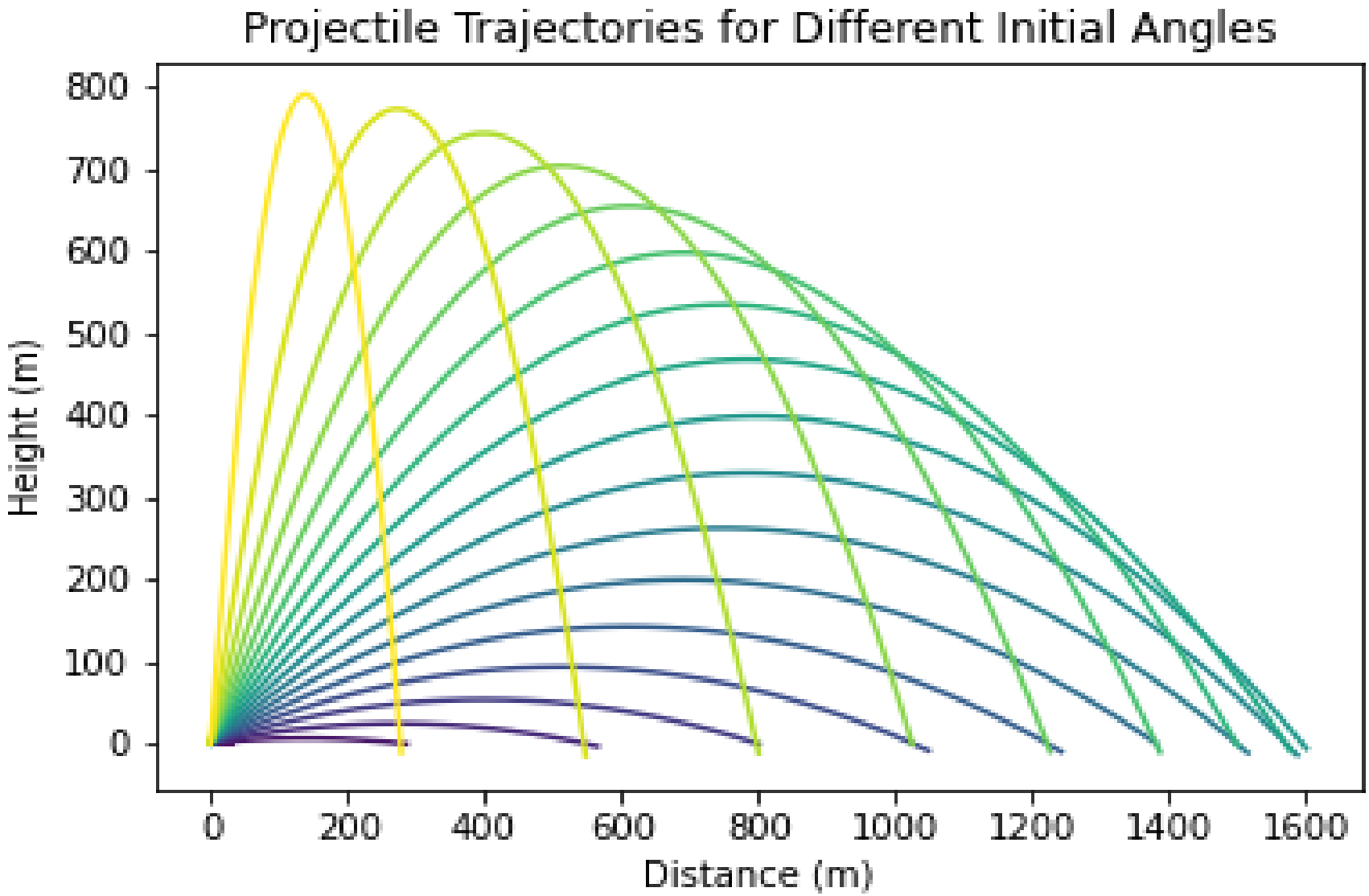
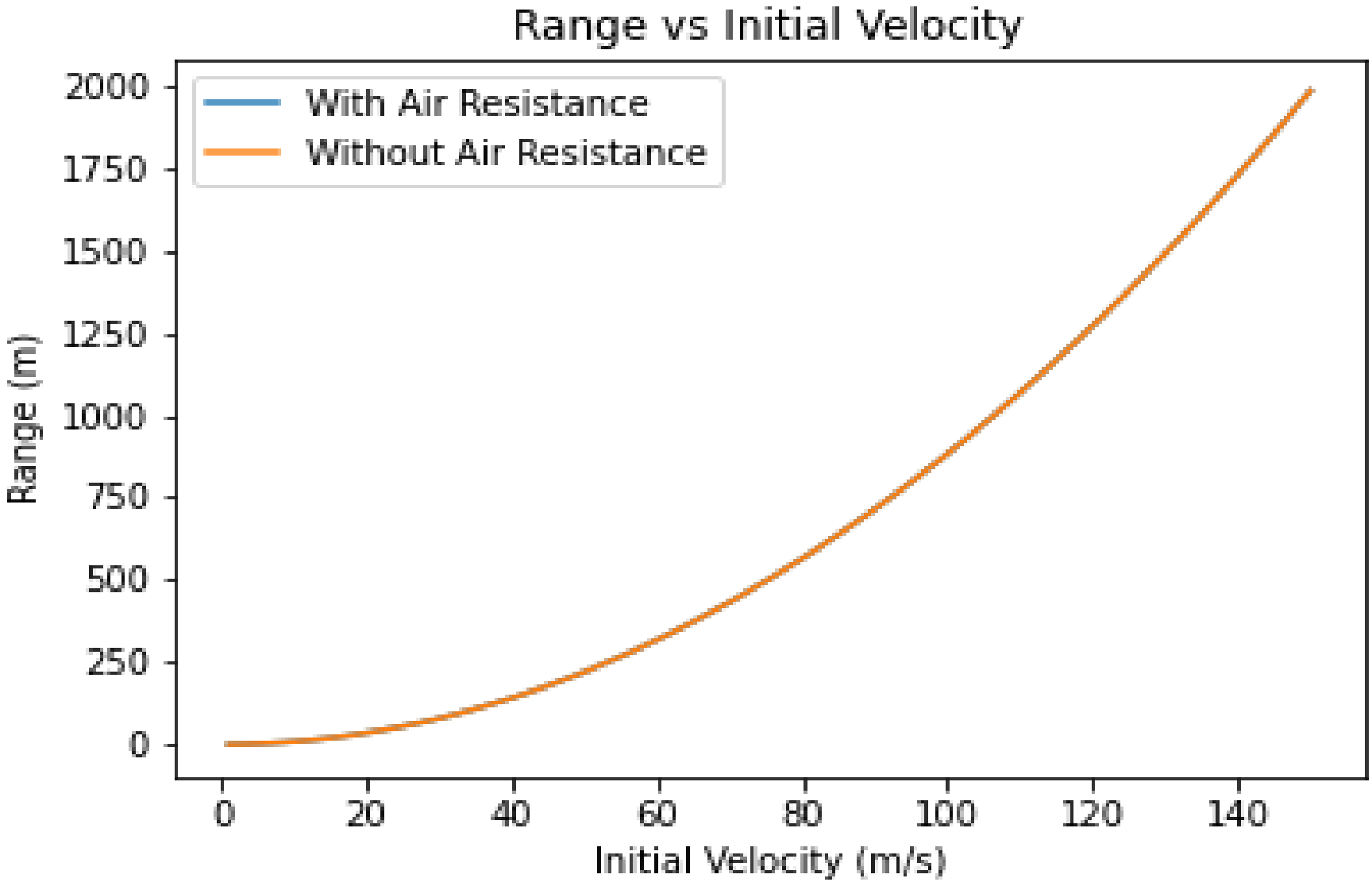
39509

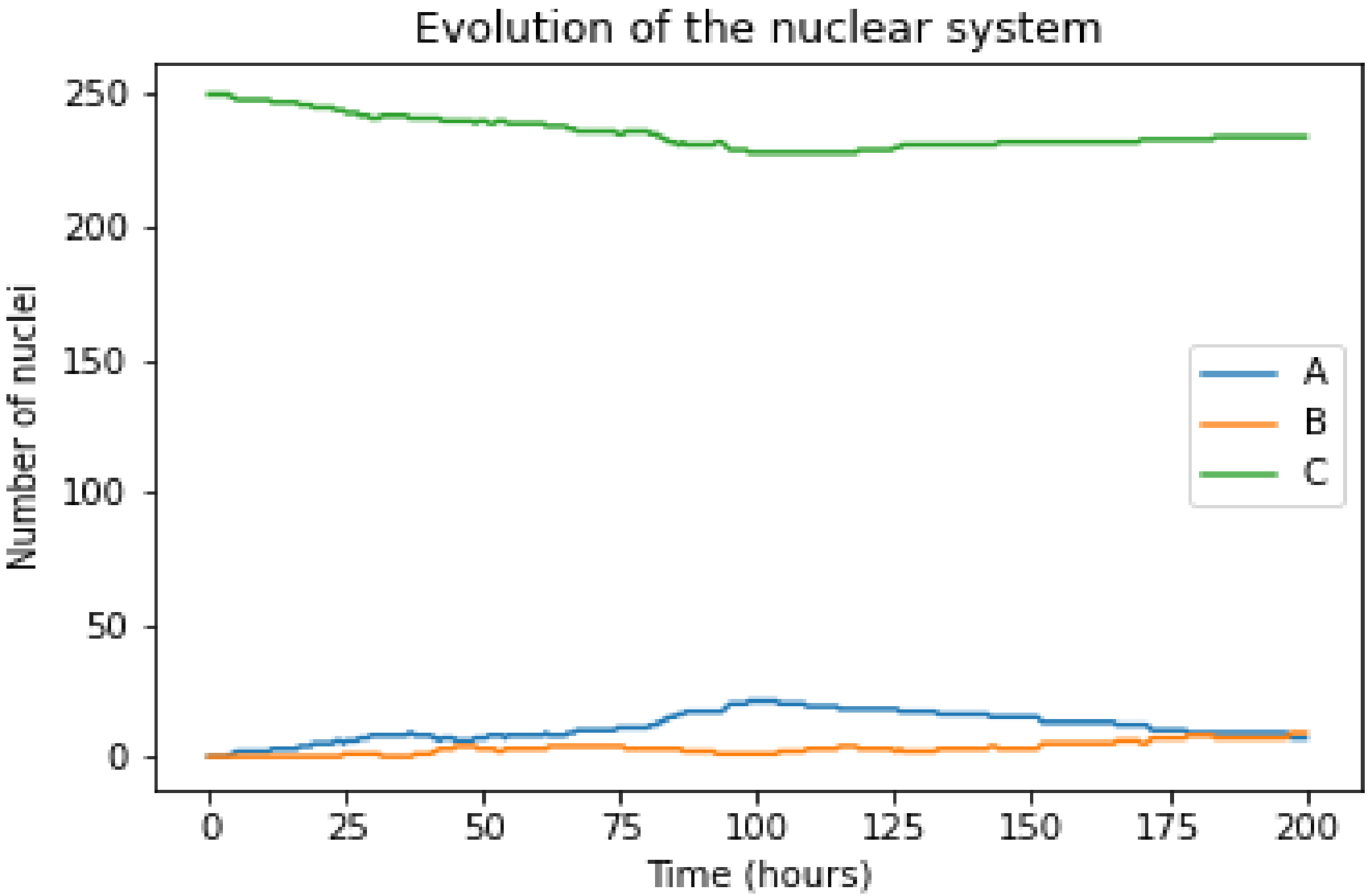

Difference Between Analytical and Numerical Derivative
dx = 0.1
dx = 0.01
dx = 0.001
Difference
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
0
1
2
3
4
5
6
x

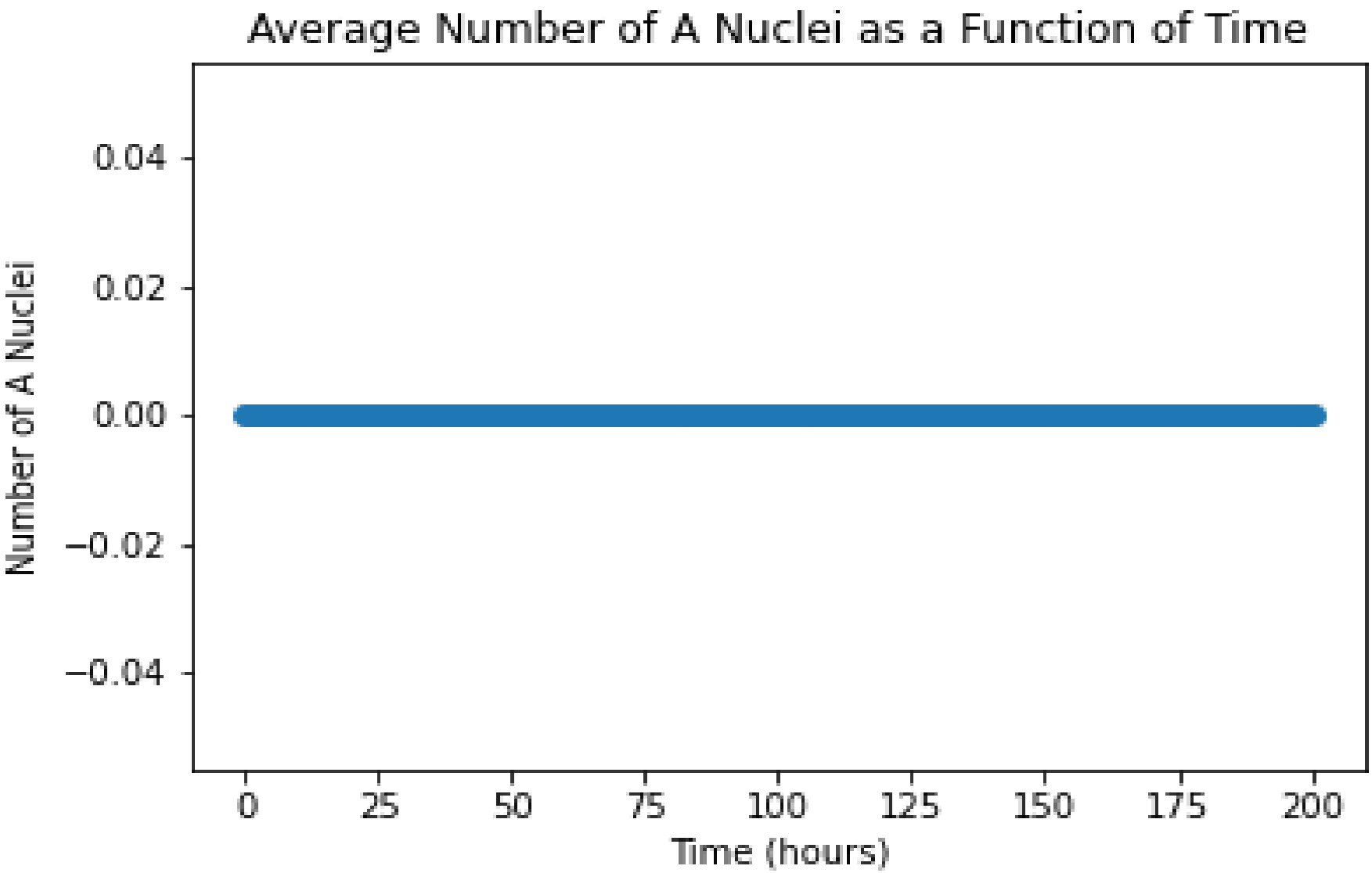

Fractional Error of Simpson's Rule Integration
Fractional Error
10^0
10^1
10^2
Number of panels (N)

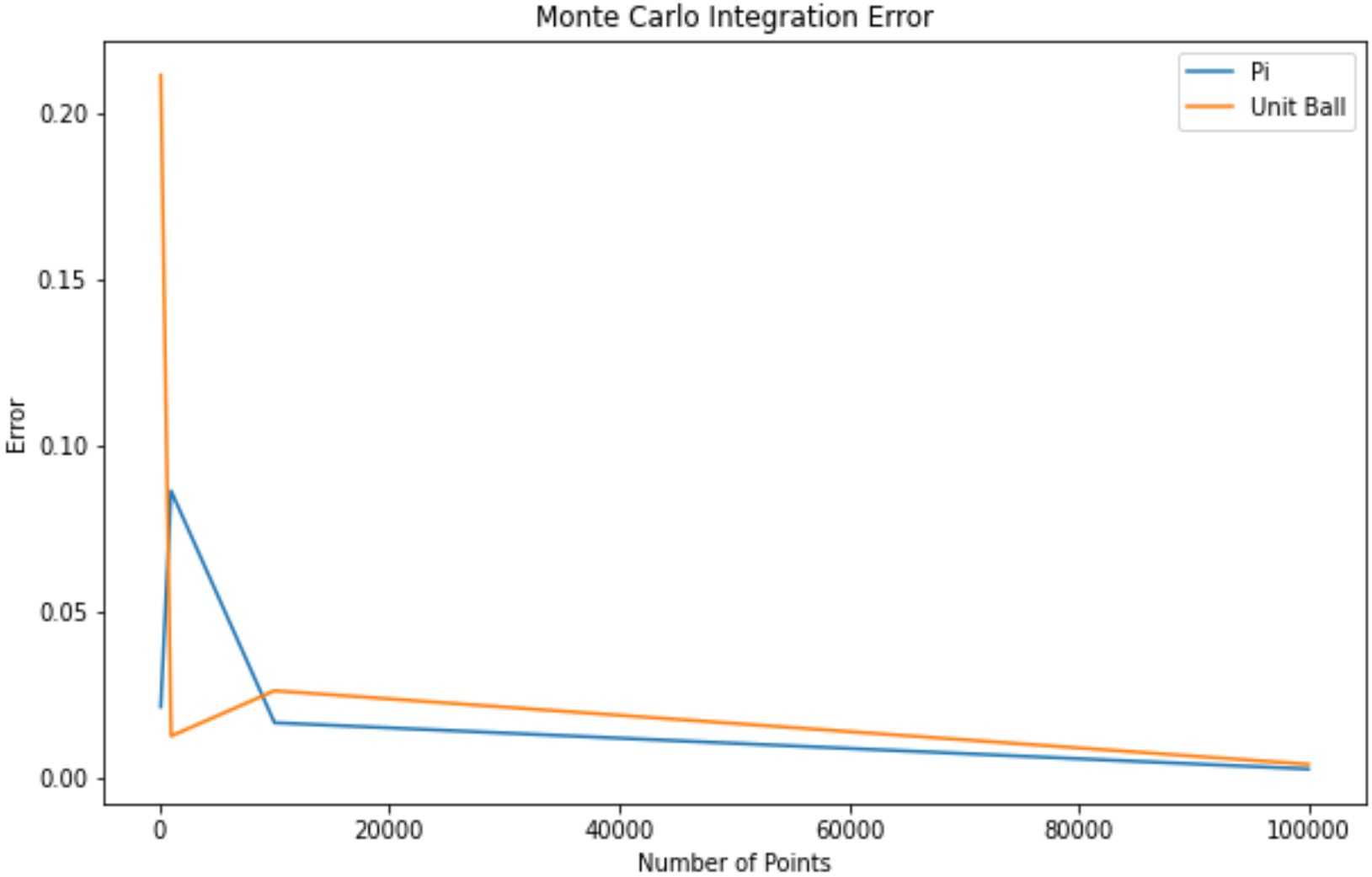

Analytic
Euler
RK4
Number of Atoms
1000
800
600
400
200
0
0
2
4
6
8
10
Time


Projectile Trajectories for Different Initial Angles
Height (m)
800
700
600
500
400
300
200
100
0
0
200
400
600
800
1000
1200
1400
1600
Distance (m)

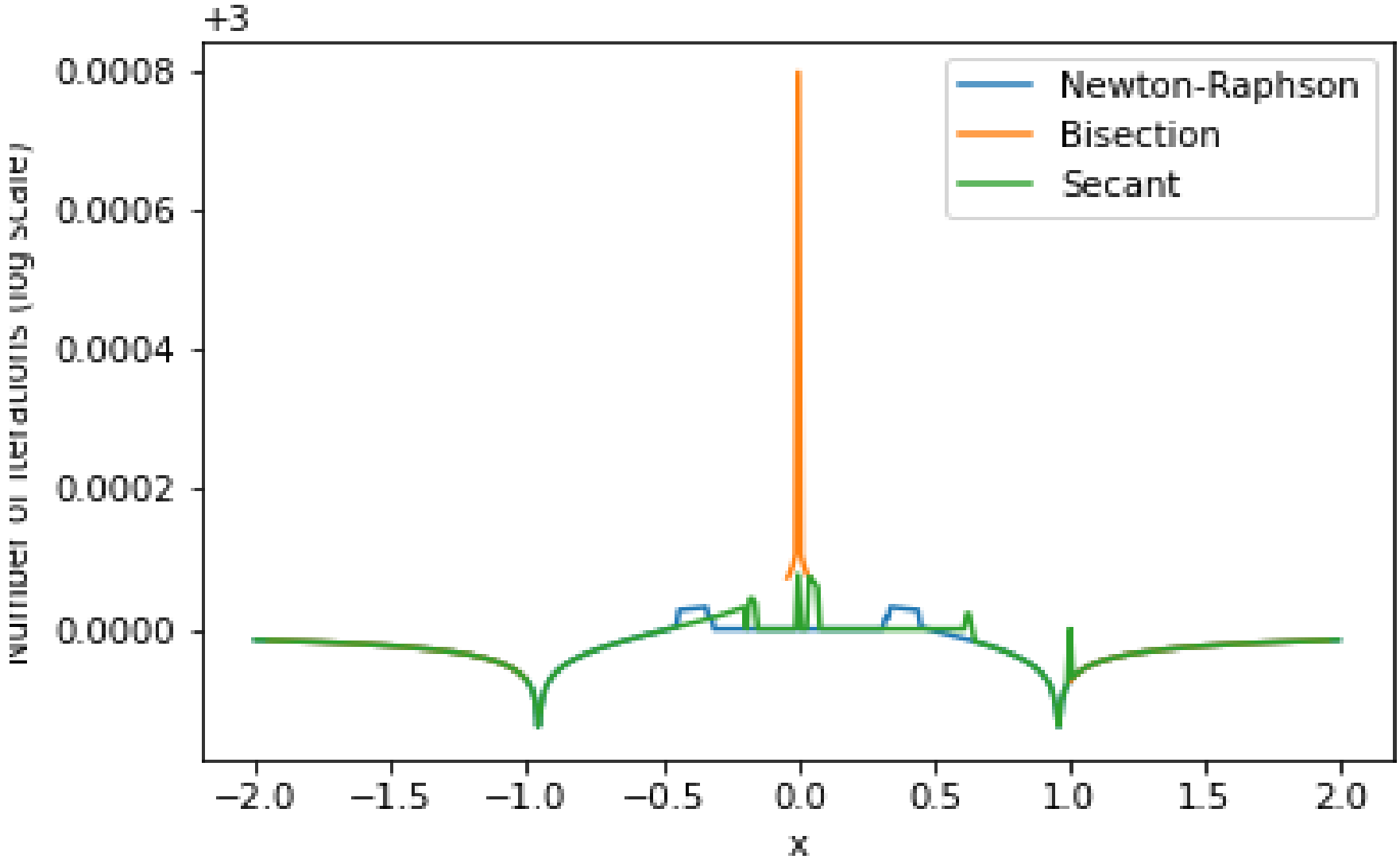

Range vs Initial Velocity
With Air Resistance
Without Air Resistance
Range (m)
2000
1750
1500
1250
1000
750
500
250
0
0
20
40
60
80
100
120
140
Initial Velocity (m/s)

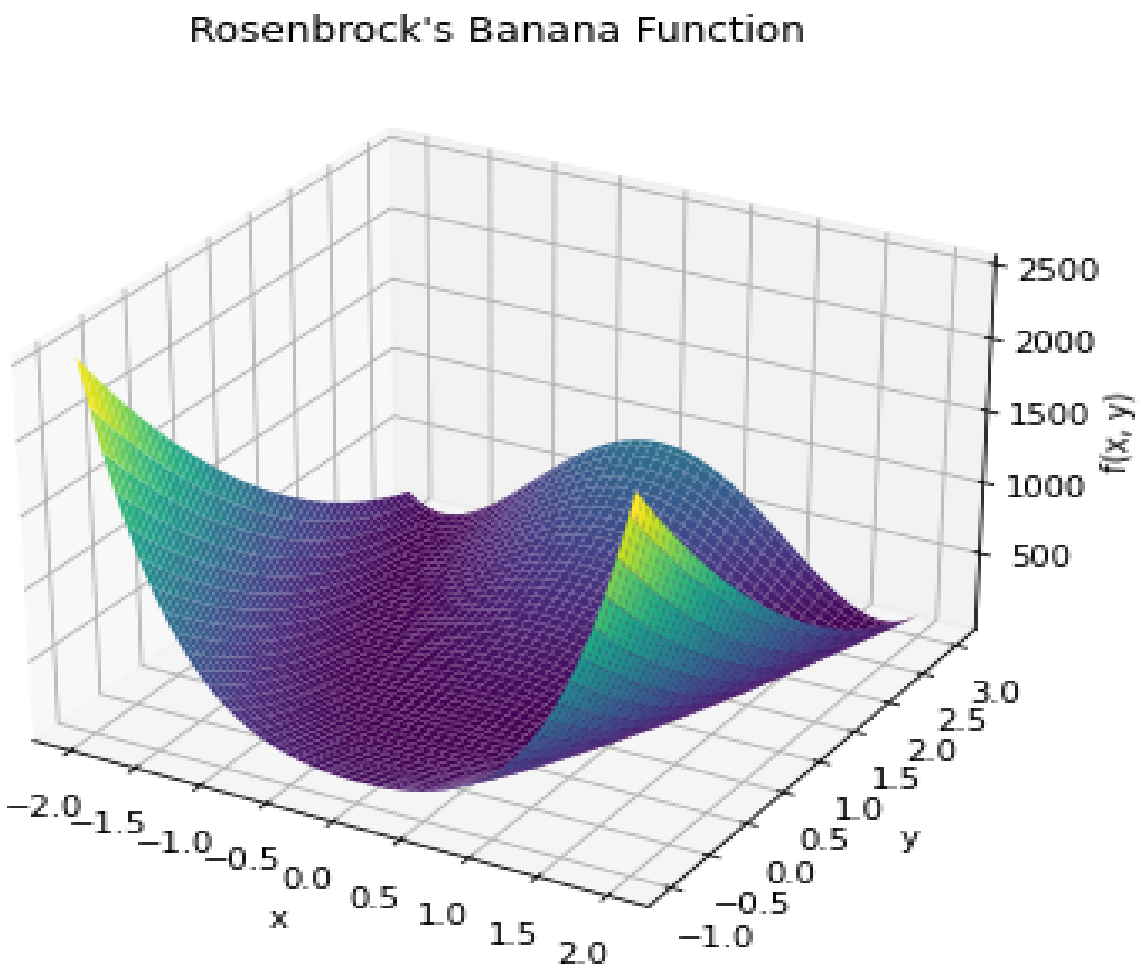

Evolution of the nuclear system
Number of nuclei
Time (hours)
A
B
C
0
50
100
150
200
250
0
25
50
75
100
125
150
175
200

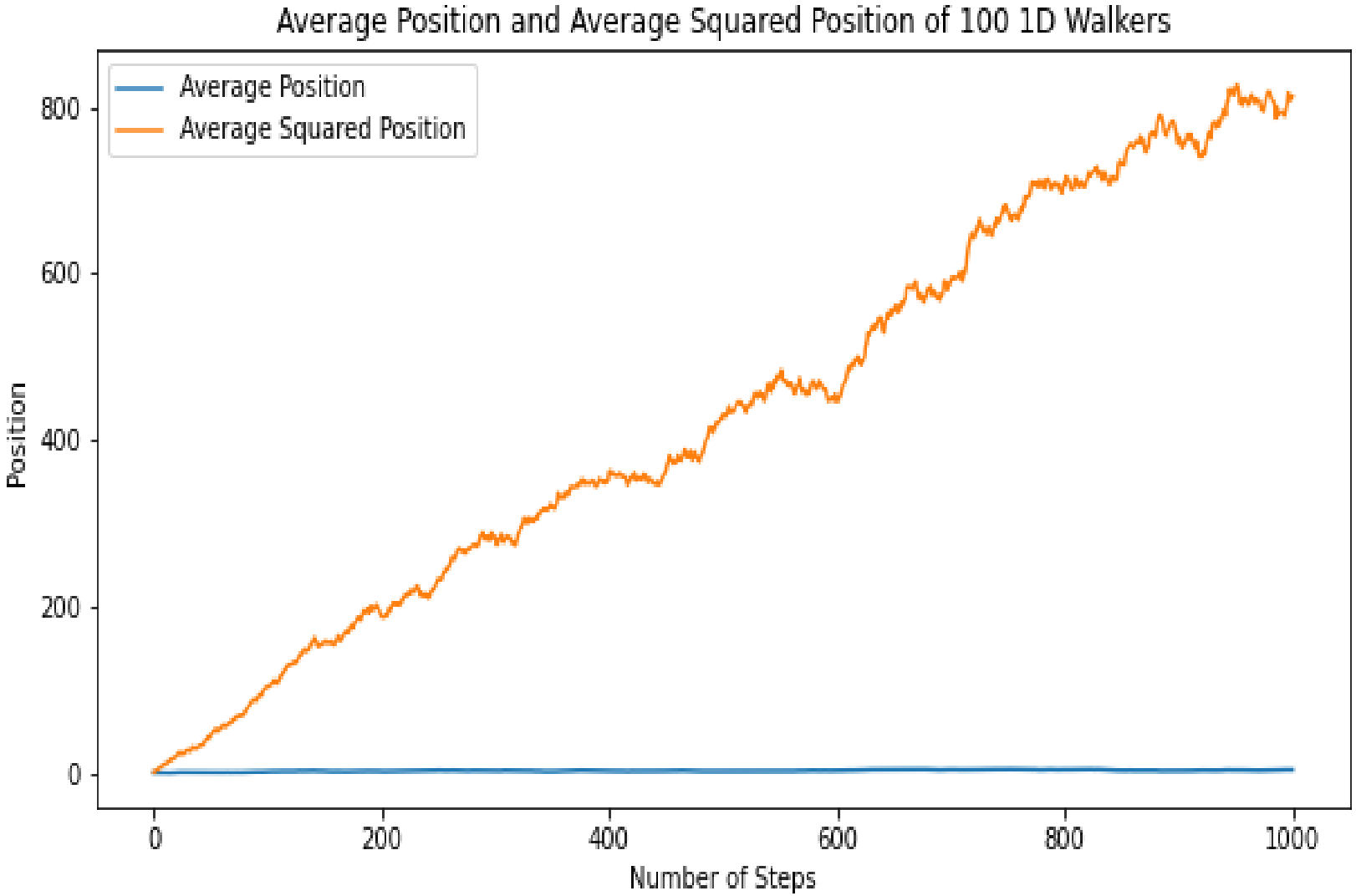

Average Number of A Nuclei as a Function of Time
Number of A Nuclei
0.04
0.02
0.00
−0.02
−0.04
0
25
50
75
100
125
150
175
200
Time (hours)

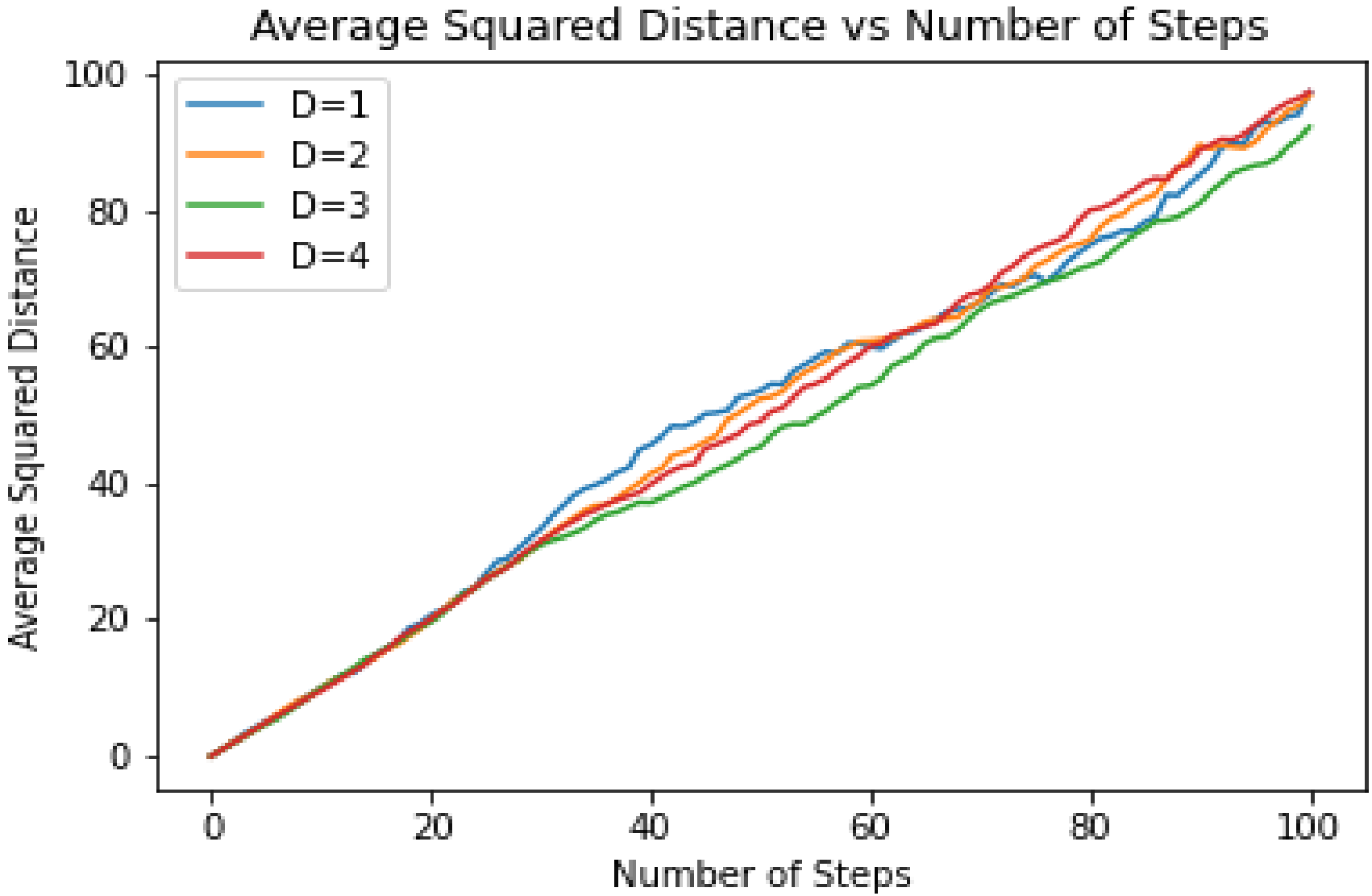

Monte Carlo Integration Error
Pi
Unit Ball
0.20
0.15
0.10
0.05
0.00
Error
0
20000
40000
60000
80000
100000
Number of Points

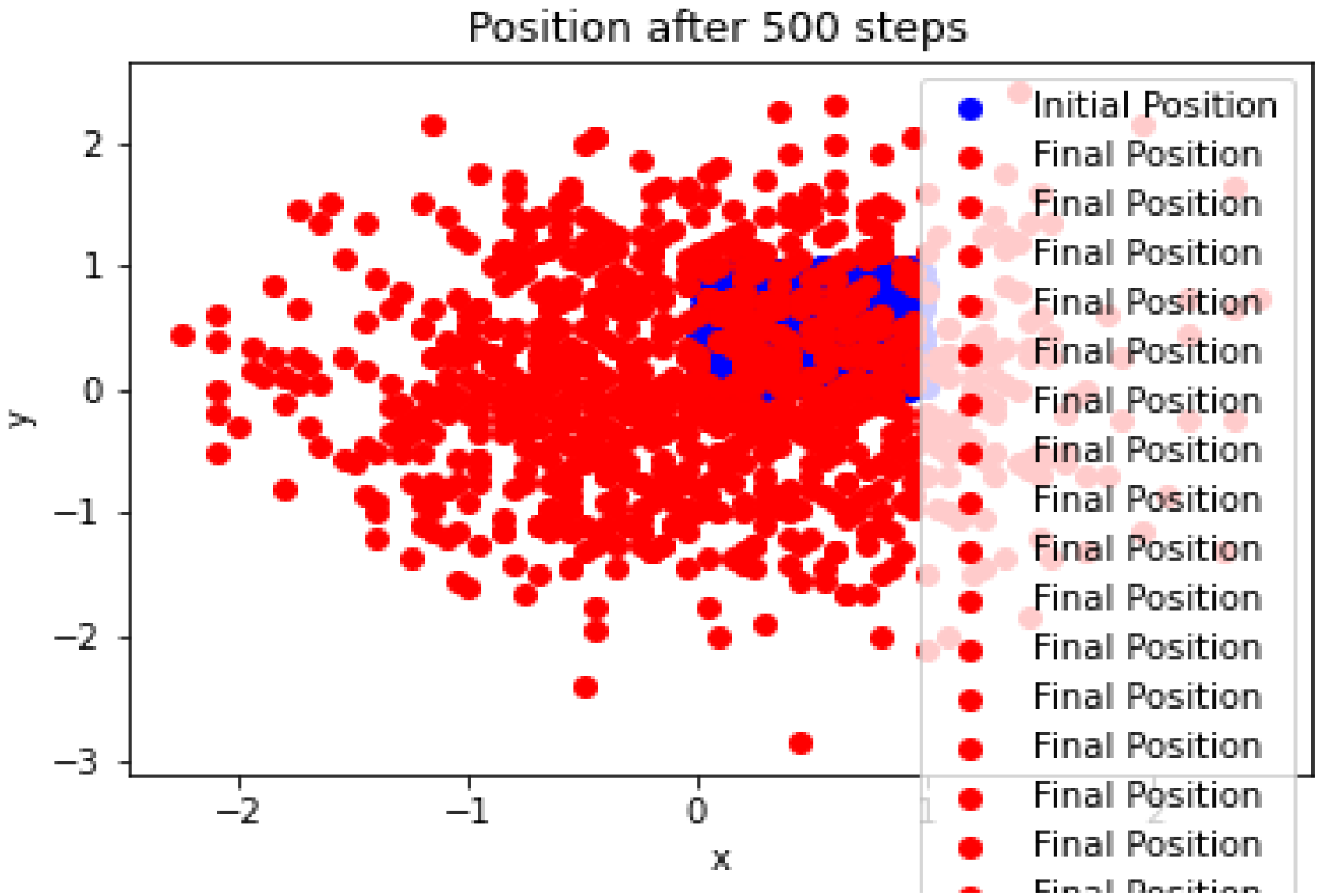
Distribution of x values
Probability density
0.20
0.15
0.10
0.05
0.00
0
2
4
6
8
10
x


+3
0.0008
0.0006
0.0004
0.0002
0.0000
Number of iterations (log scale)
Newton-Raphson
Bisection
Secant
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
x


Rosenbrock's Banana Function
2500
2000
1500
1000
500
f(x, y)
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
x
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
y


Average Position and Average Squared Position of 100 1D Walkers
Average Position
Average Squared Position
Position
0
200
400
600
800
0
200
400
600
800
1000
Number of Steps


Average Squared Distance vs Number of Steps
Average Squared Distance
Number of Steps
D=1
D=2
D=3
D=4
0
20
40
60
80
100


Position after 500 steps
Initial Position
Final Position
x
y
2
1
0
−1
−2
−3
−2
−1
0

AI?