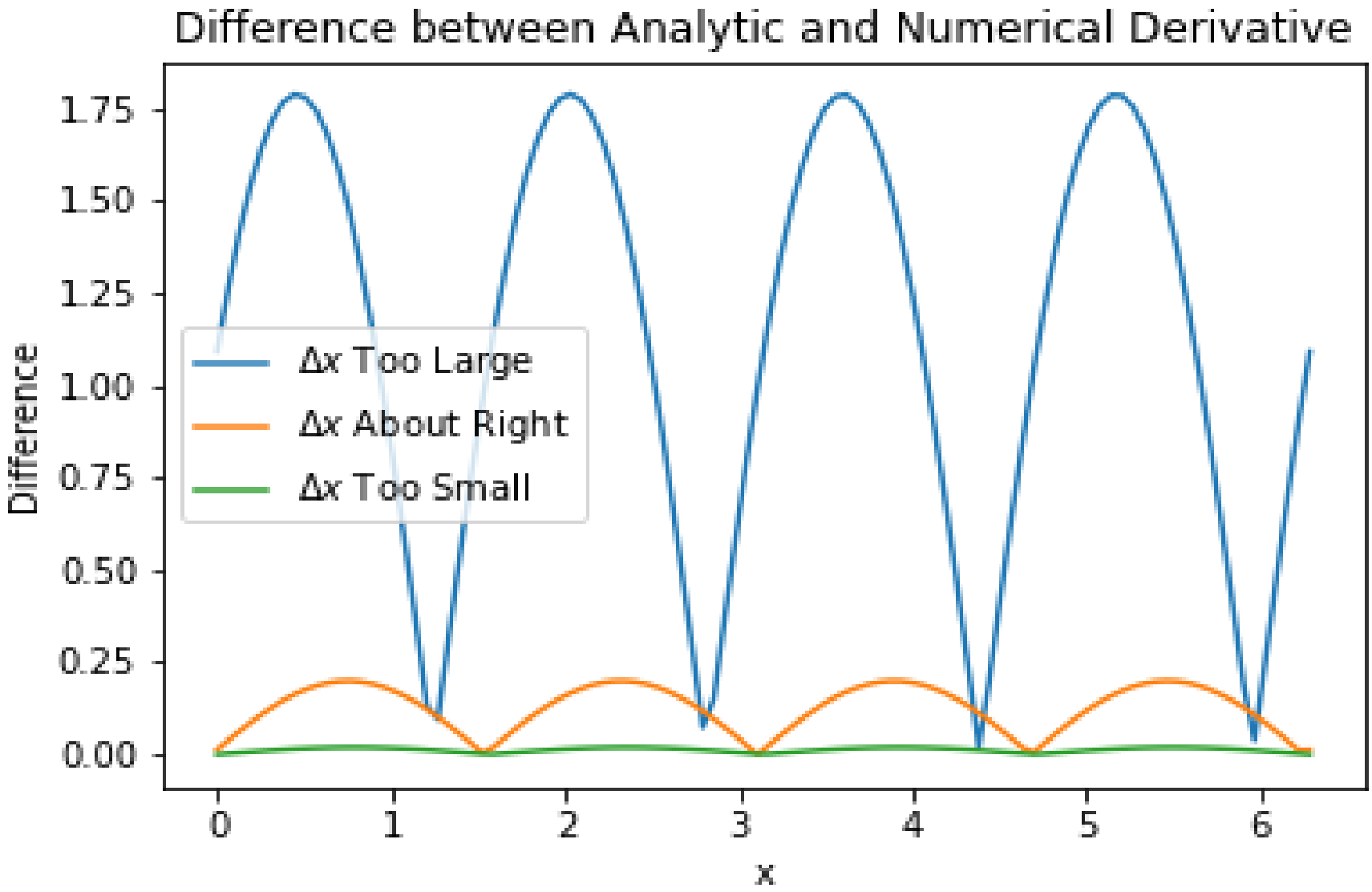
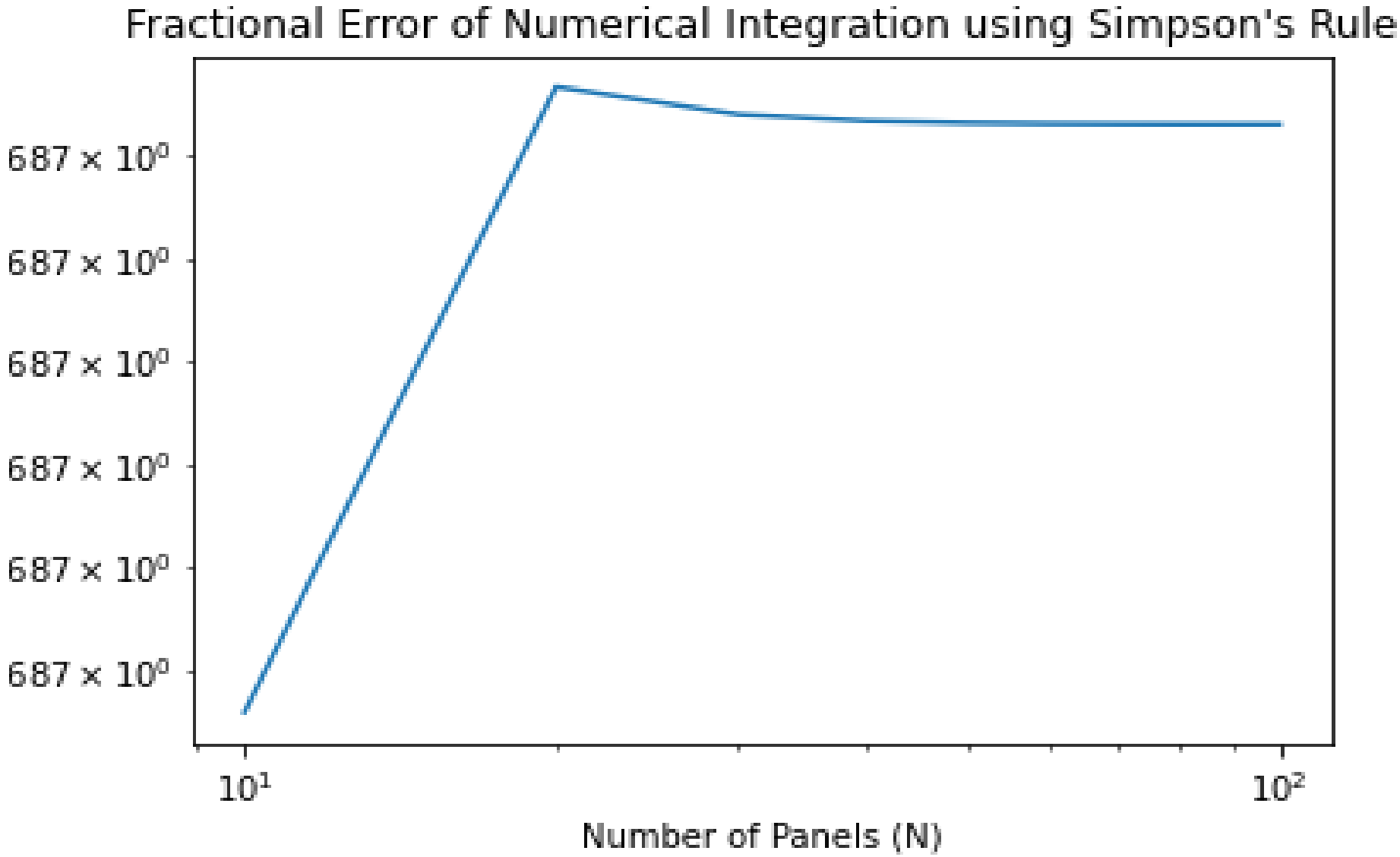
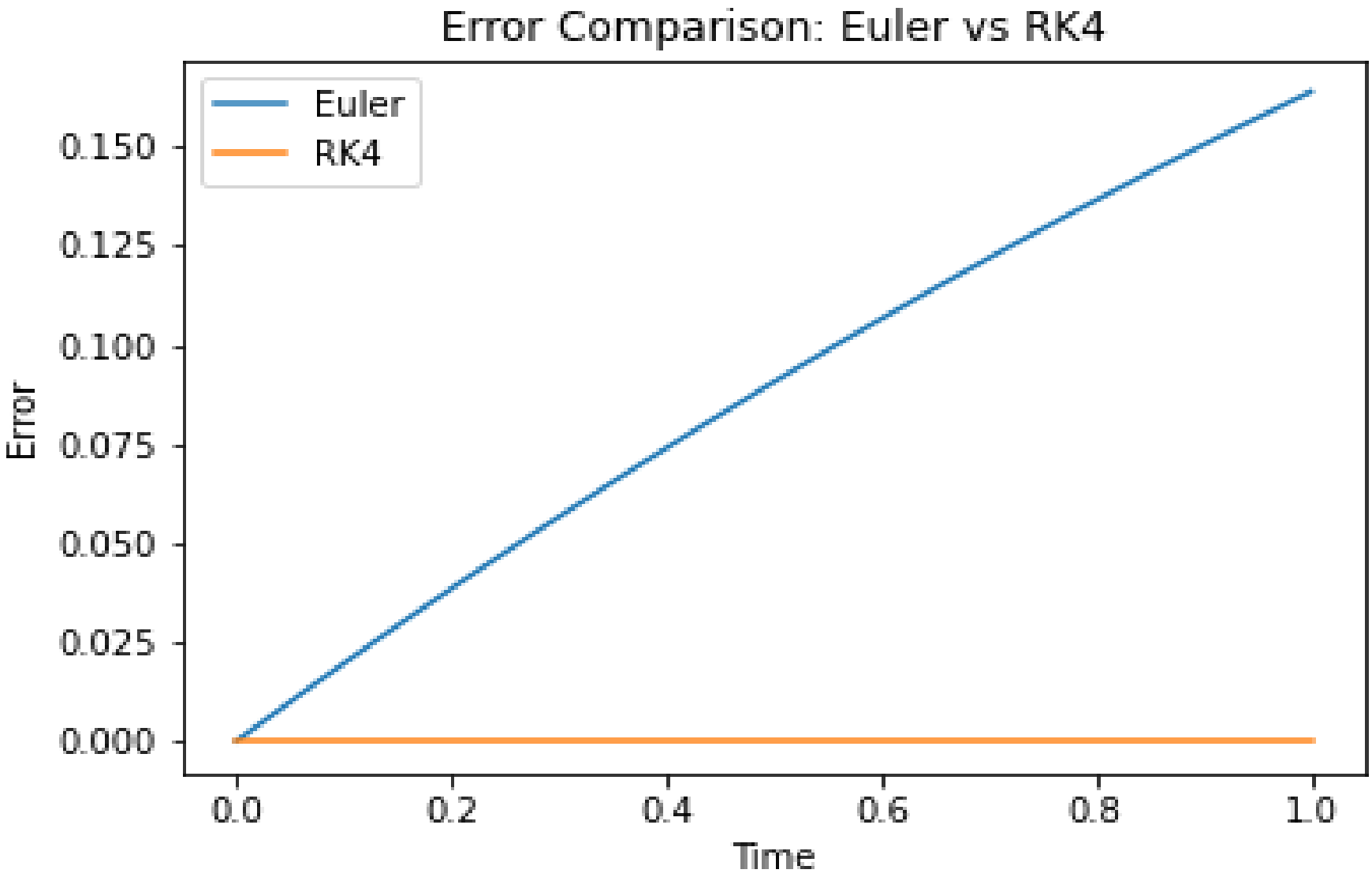
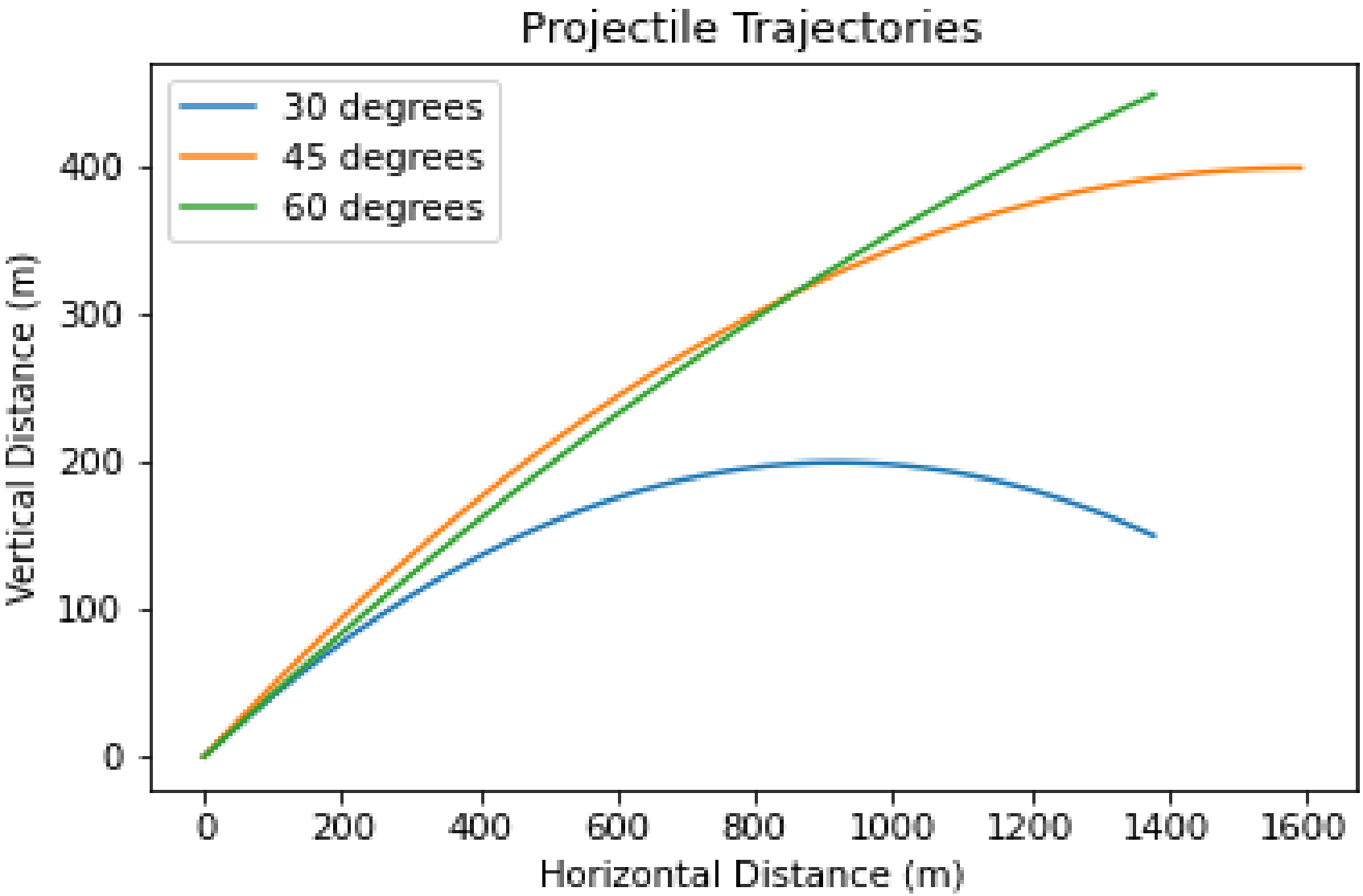
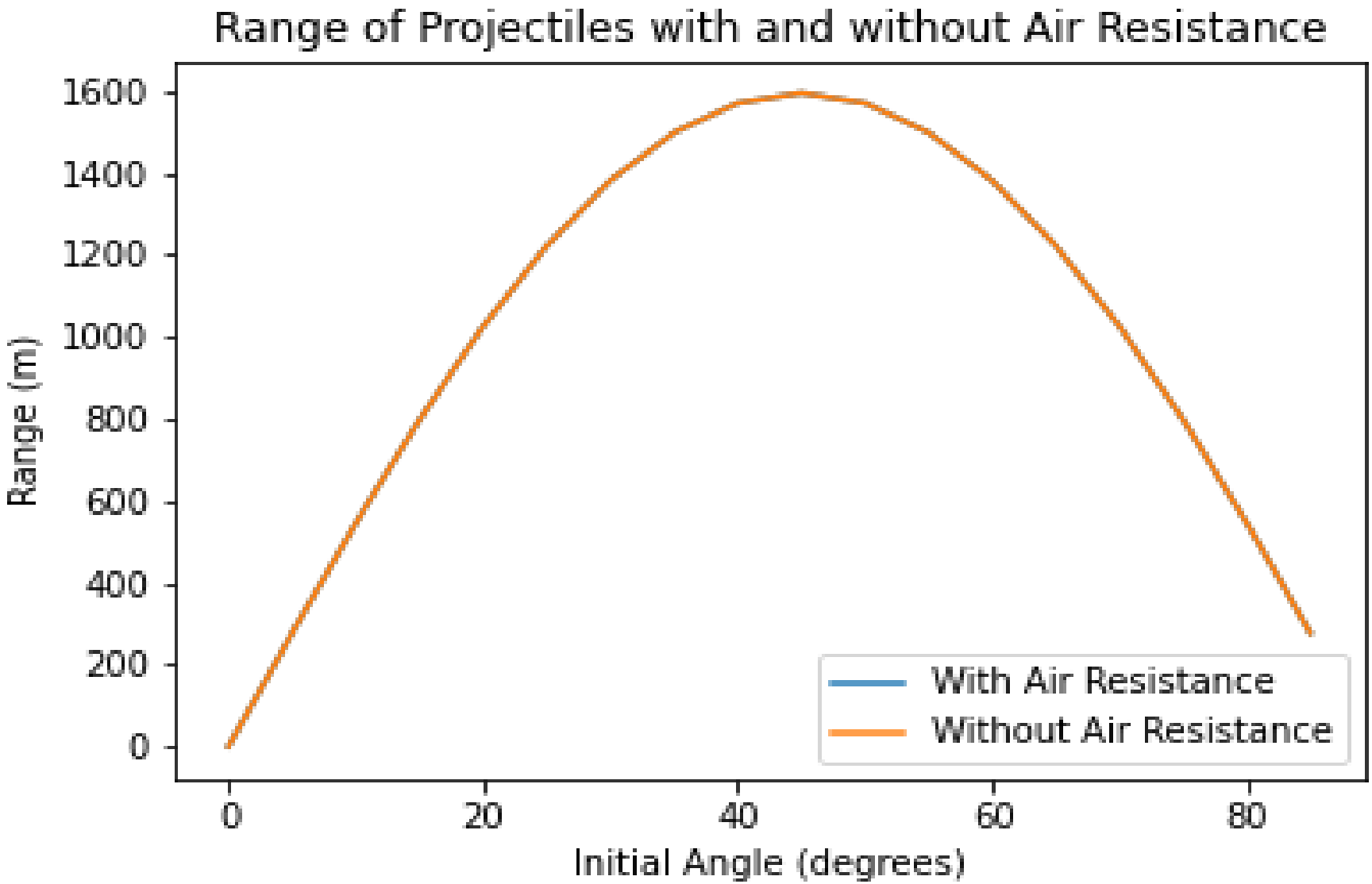
68889

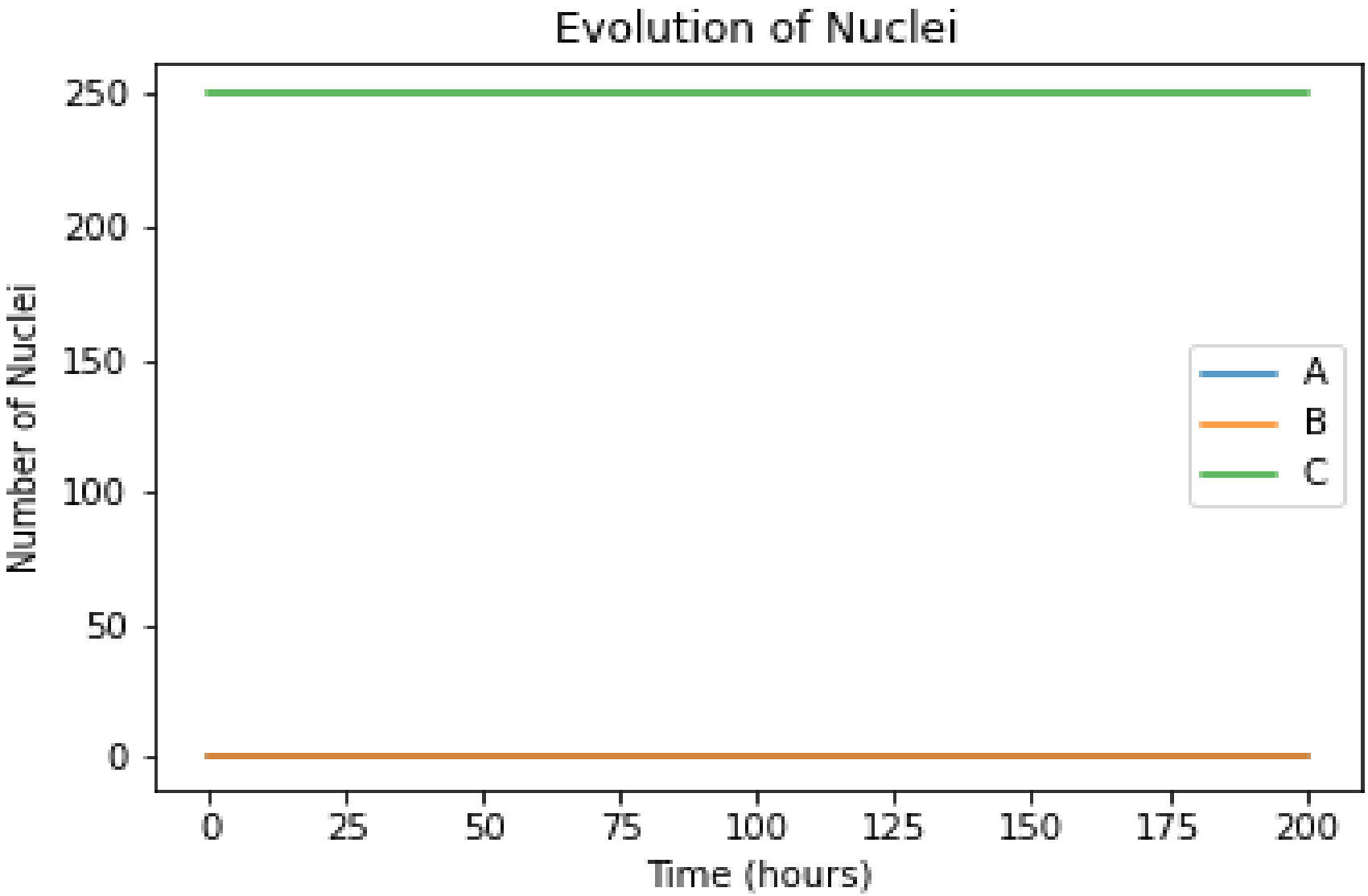

Difference between Analytic and Numerical Derivative
Difference
x
Δx Too Large
Δx About Right
Δx Too Small
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
0
1
2
3
4
5
6

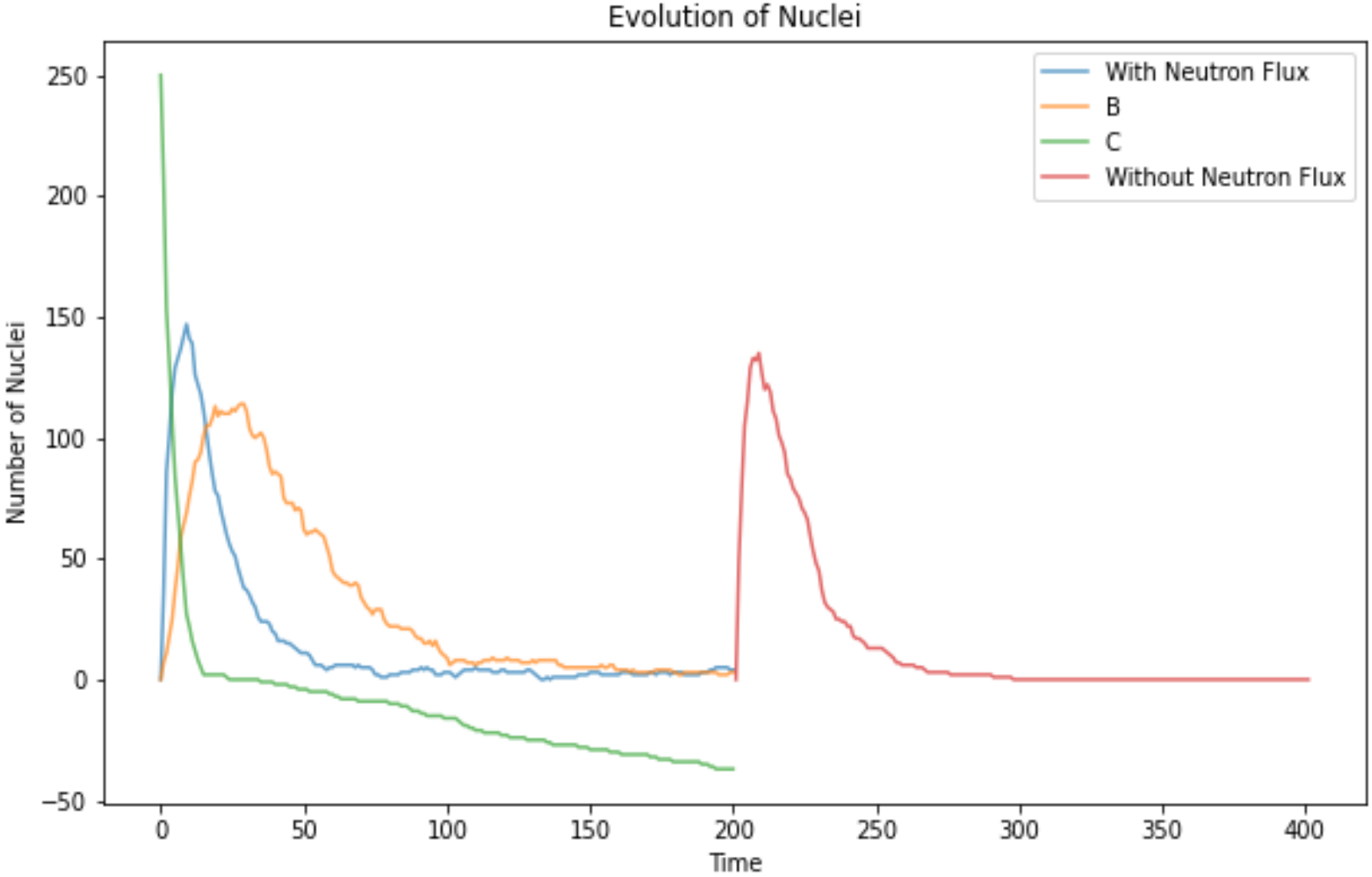

Fractional Error of Numerical Integration using Simpson's Rule
687 × 10^0
687 × 10^0
687 × 10^0
687 × 10^0
687 × 10^0
687 × 10^0
10^1
10^2
Number of Panels (N)

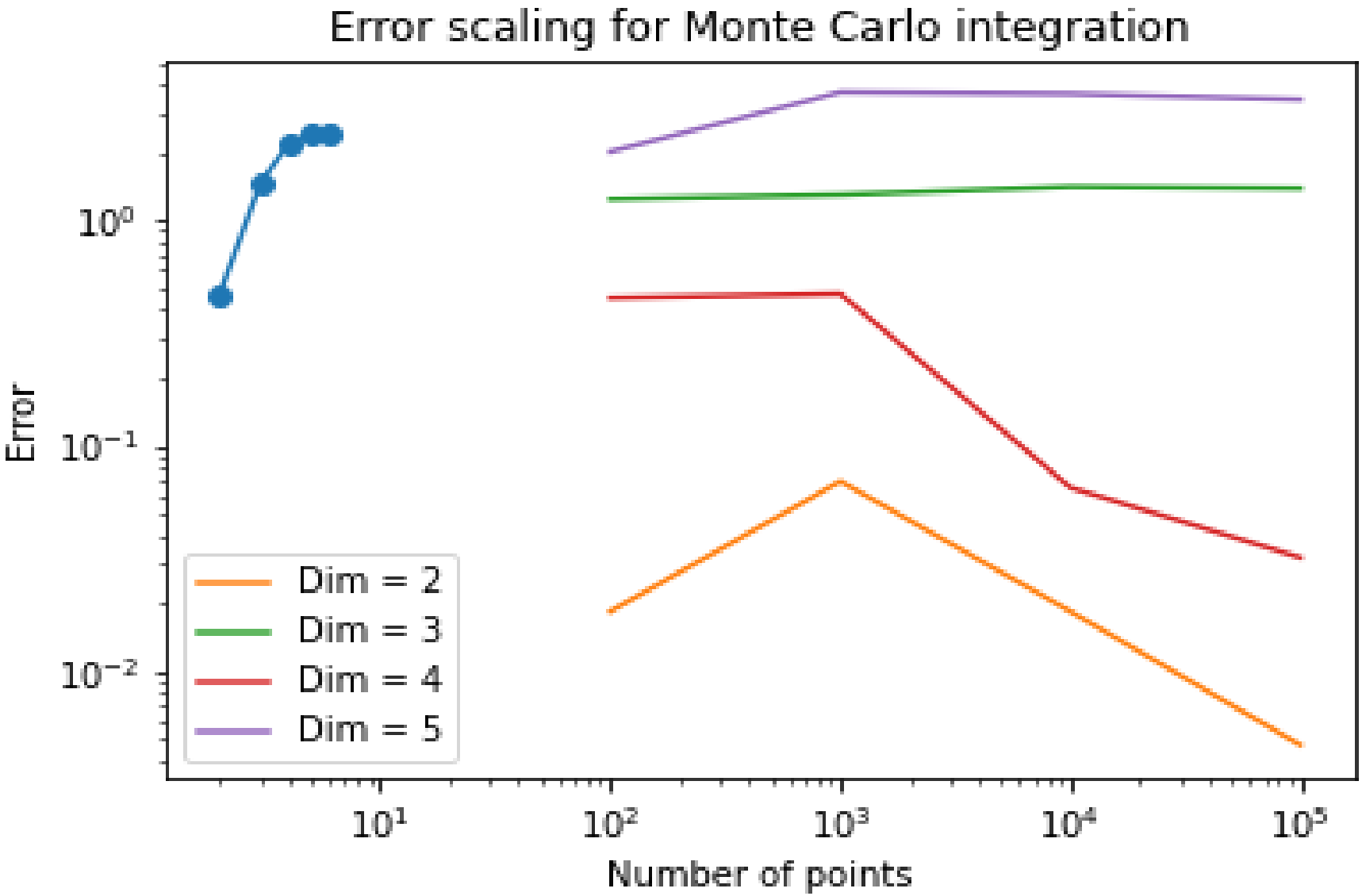

Error Comparison: Euler vs RK4
Euler
RK4
0.150
0.125
0.100
0.075
0.050
0.025
0.000
Error
0.0
0.2
0.4
0.6
0.8
1.0
Time

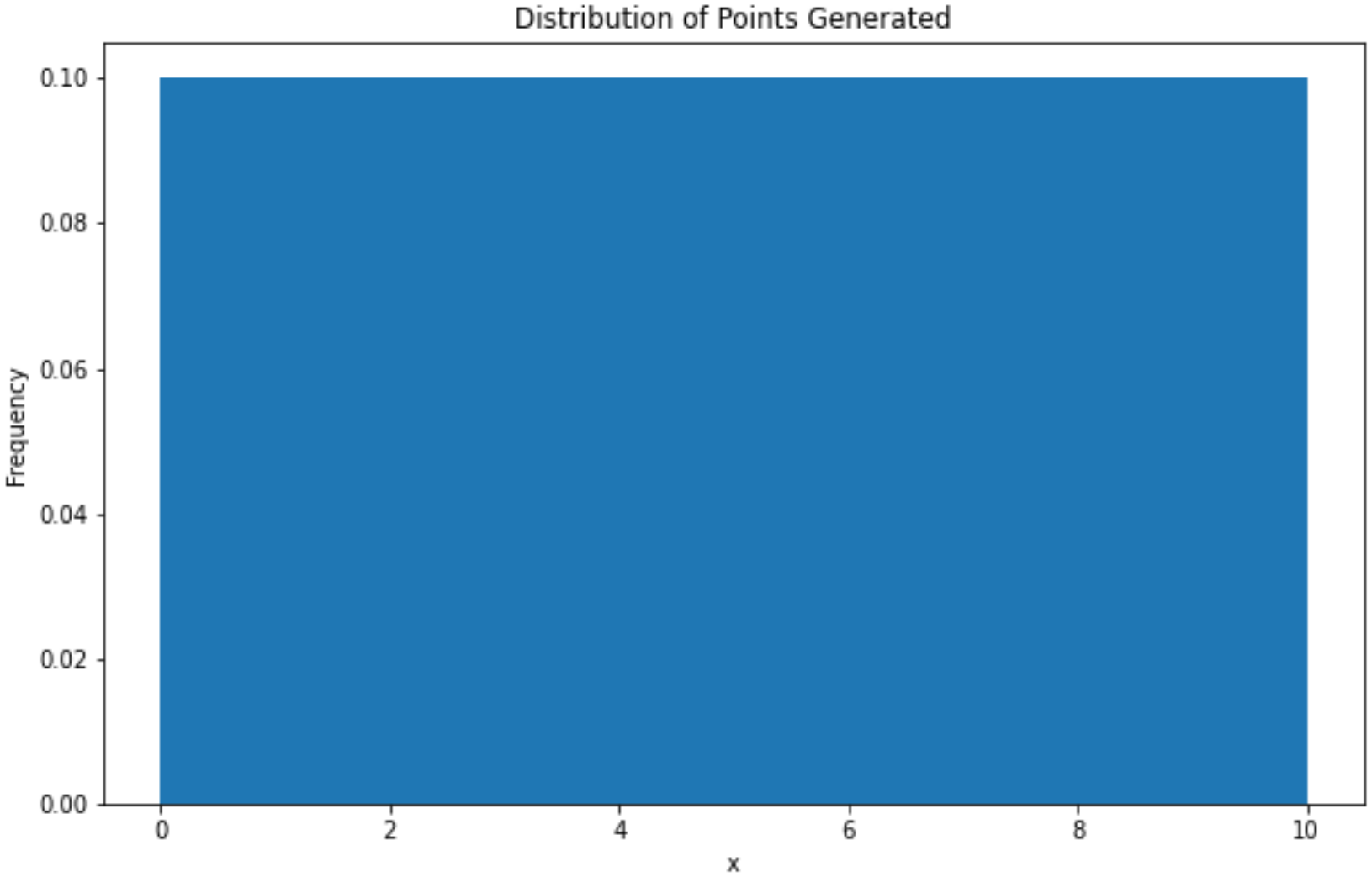

Projectile Trajectories
30 degrees
45 degrees
60 degrees
Vertical Distance (m)
0
100
200
300
400
0
200
400
600
800
1000
1200
1400
1600
Horizontal Distance (m)

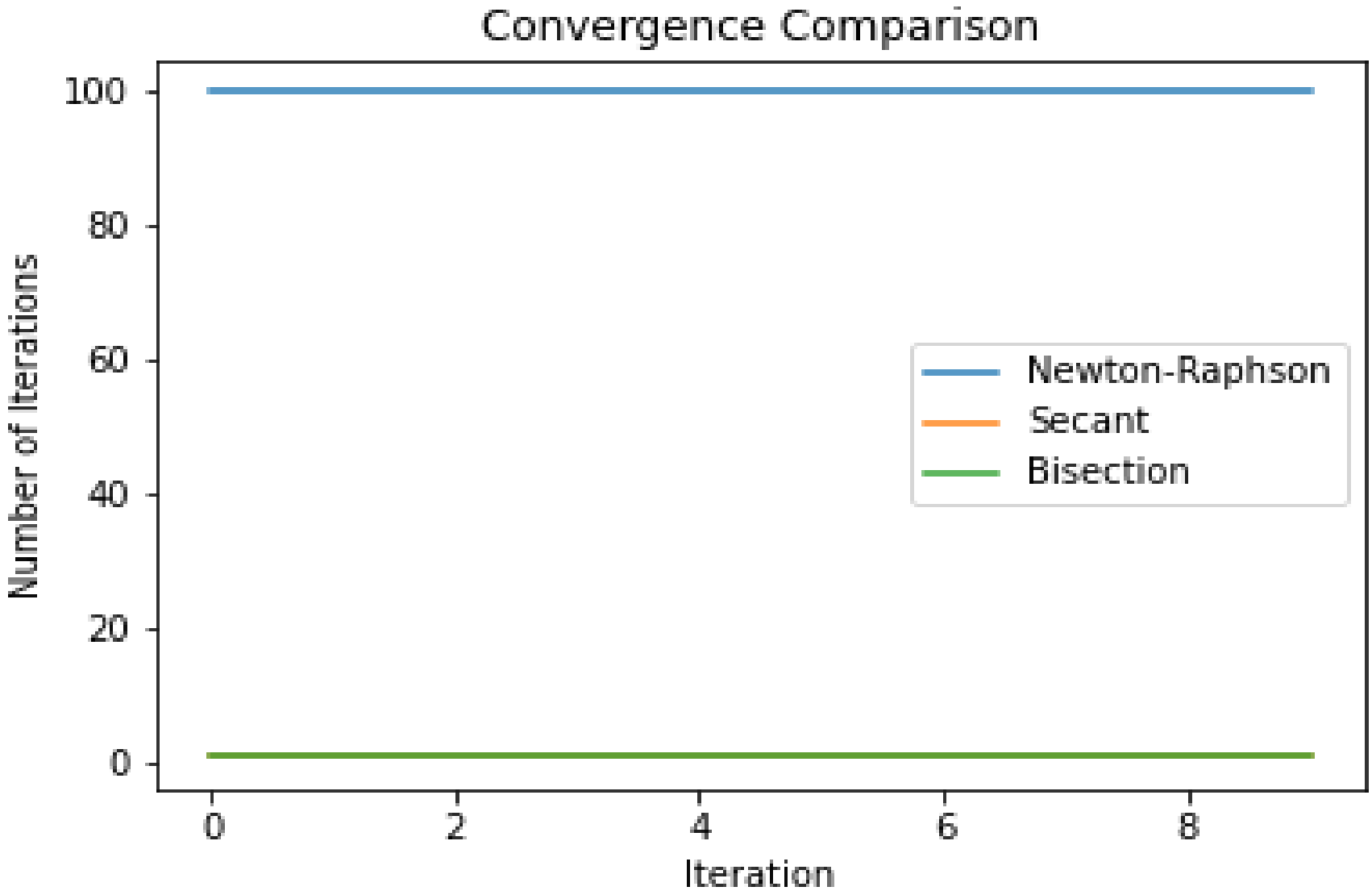

Range of Projectiles with and without Air Resistance
Range (m)
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
Initial Angle (degrees)
With Air Resistance
Without Air Resistance

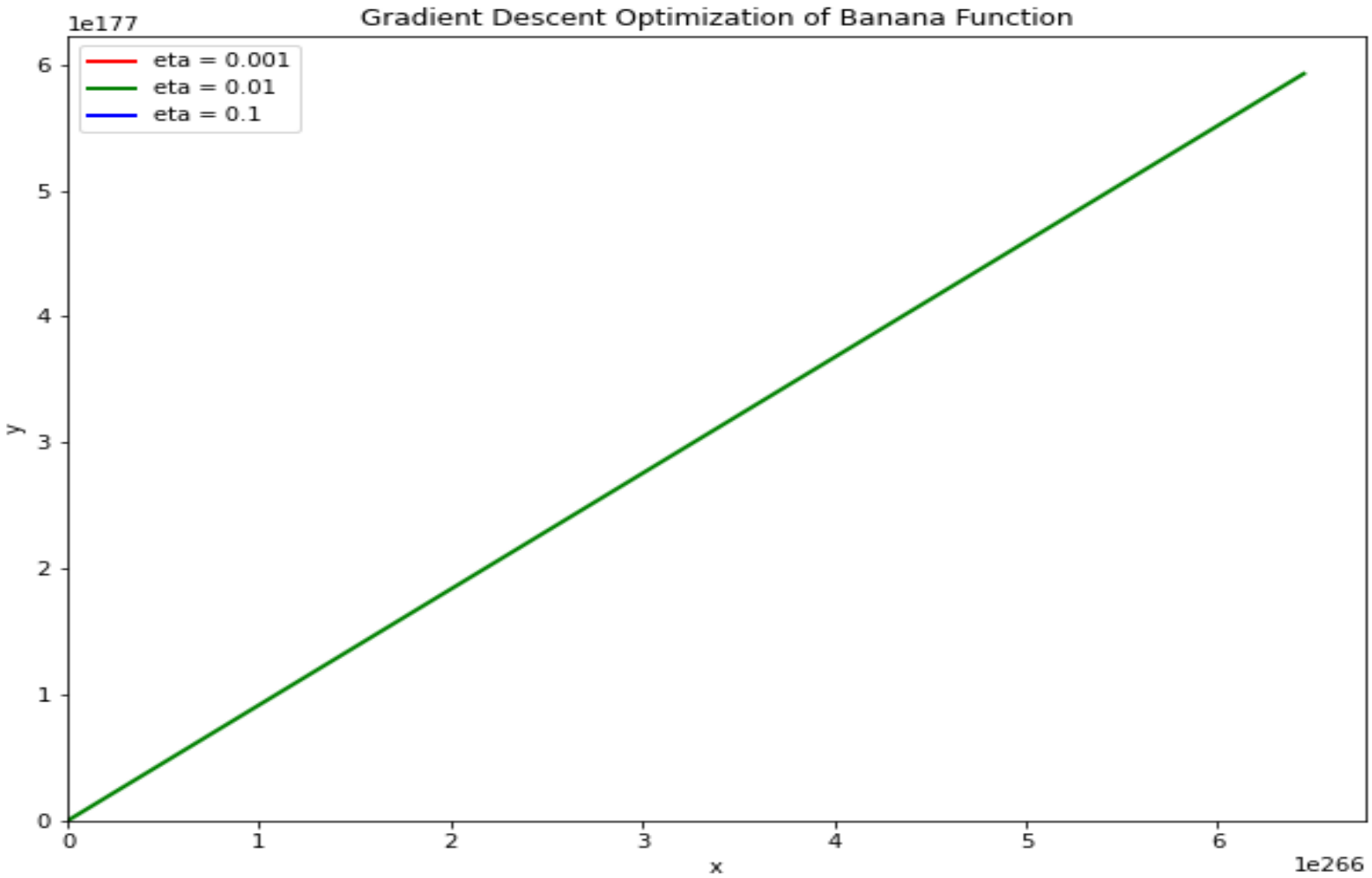

Evolution of Nuclei
Number of Nuclei
Time (hours)
250
200
150
100
50
0
0
25
50
75
100
125
150
175
200
A
B
C

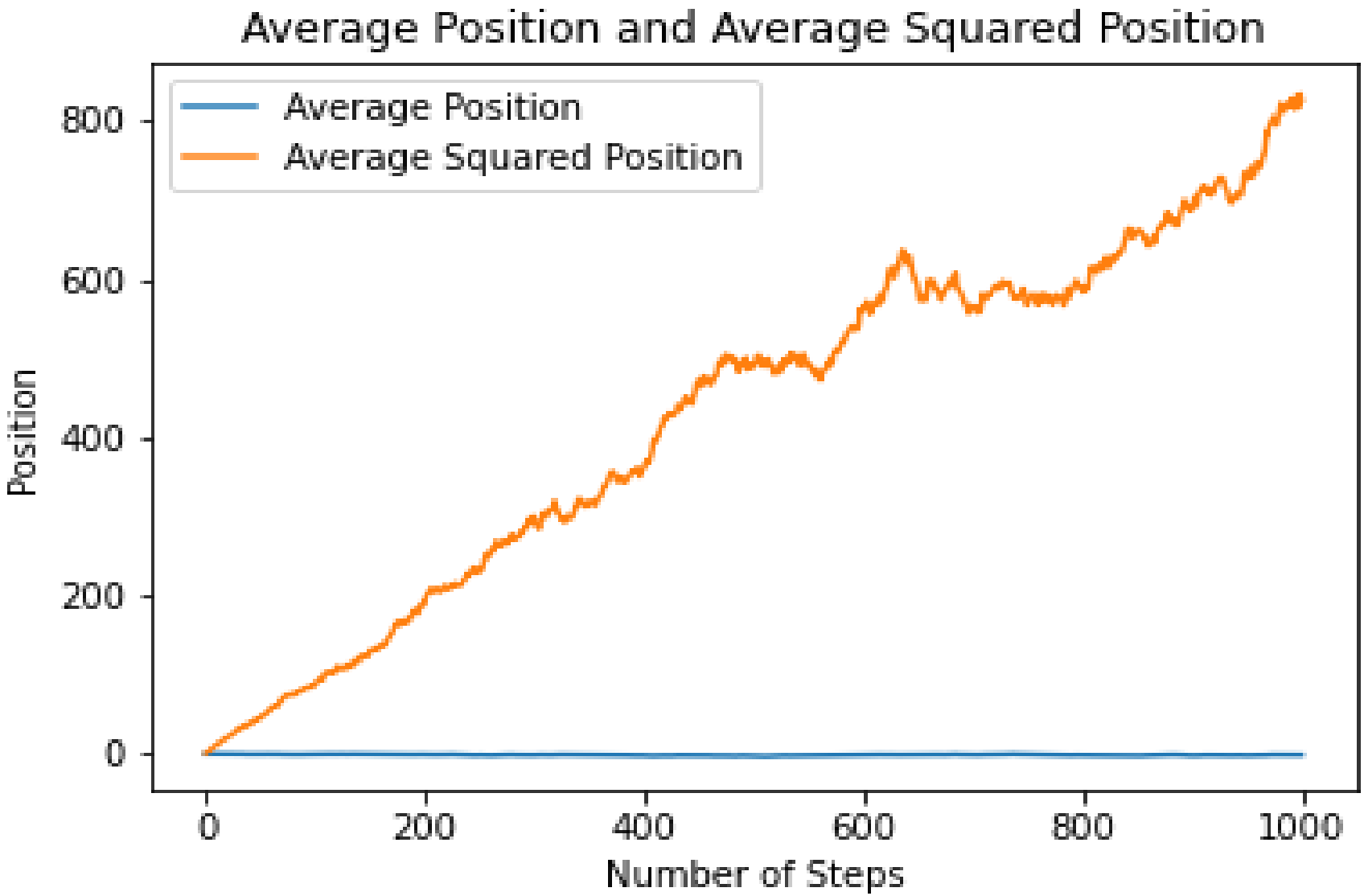

Evolution of Nuclei
With Neutron Flux
B
C
Without Neutron Flux
Number of Nuclei
Time
250
200
150
100
50
0
−50
0
50
100
150
200
250
300
350
400

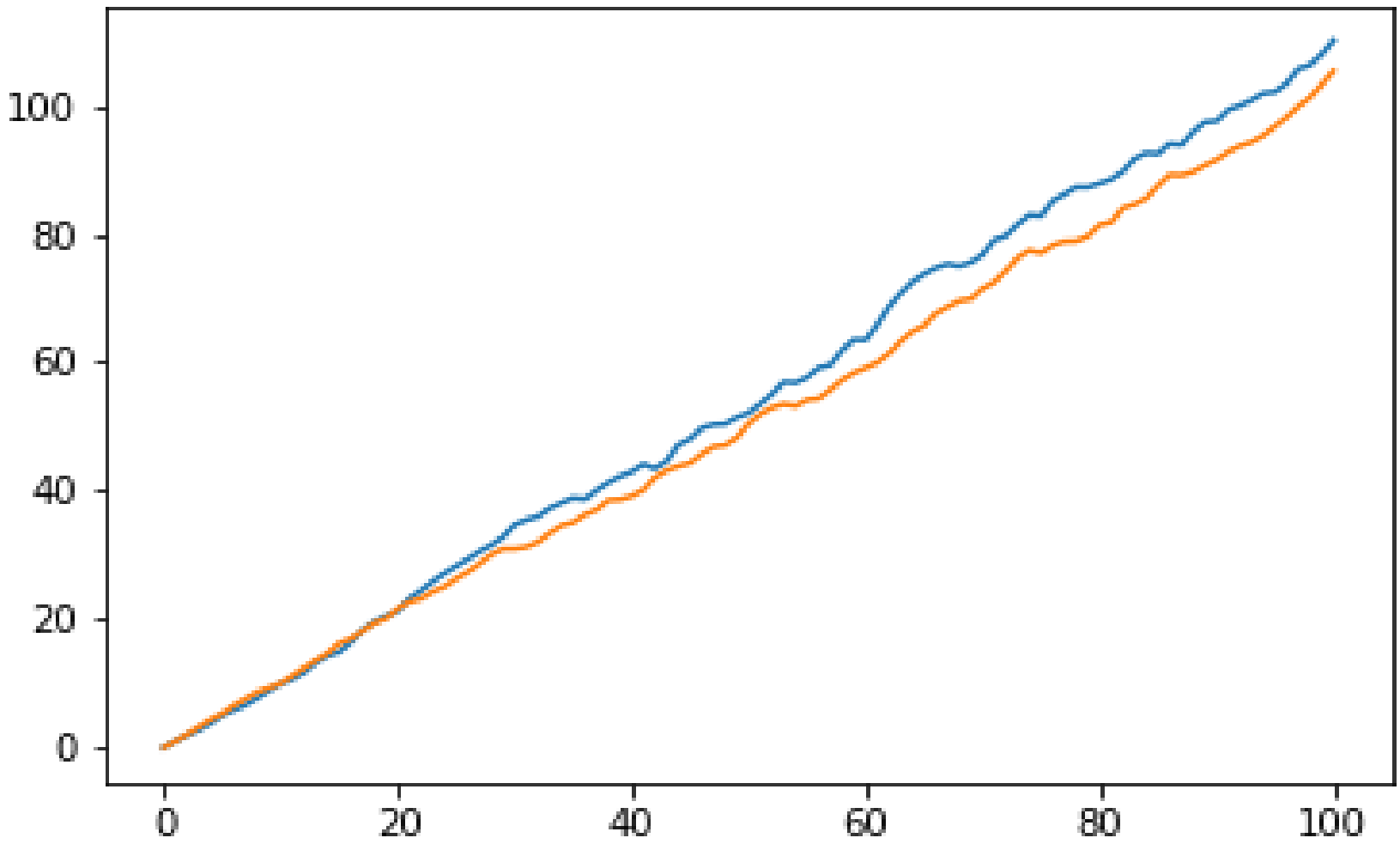

Error scaling for Monte Carlo integration
Error
10^{0}
10^{-1}
10^{-2}
10^{1}
10^{2}
10^{3}
10^{4}
10^{5}
Number of points
Dim = 2
Dim = 3
Dim = 4
Dim = 5

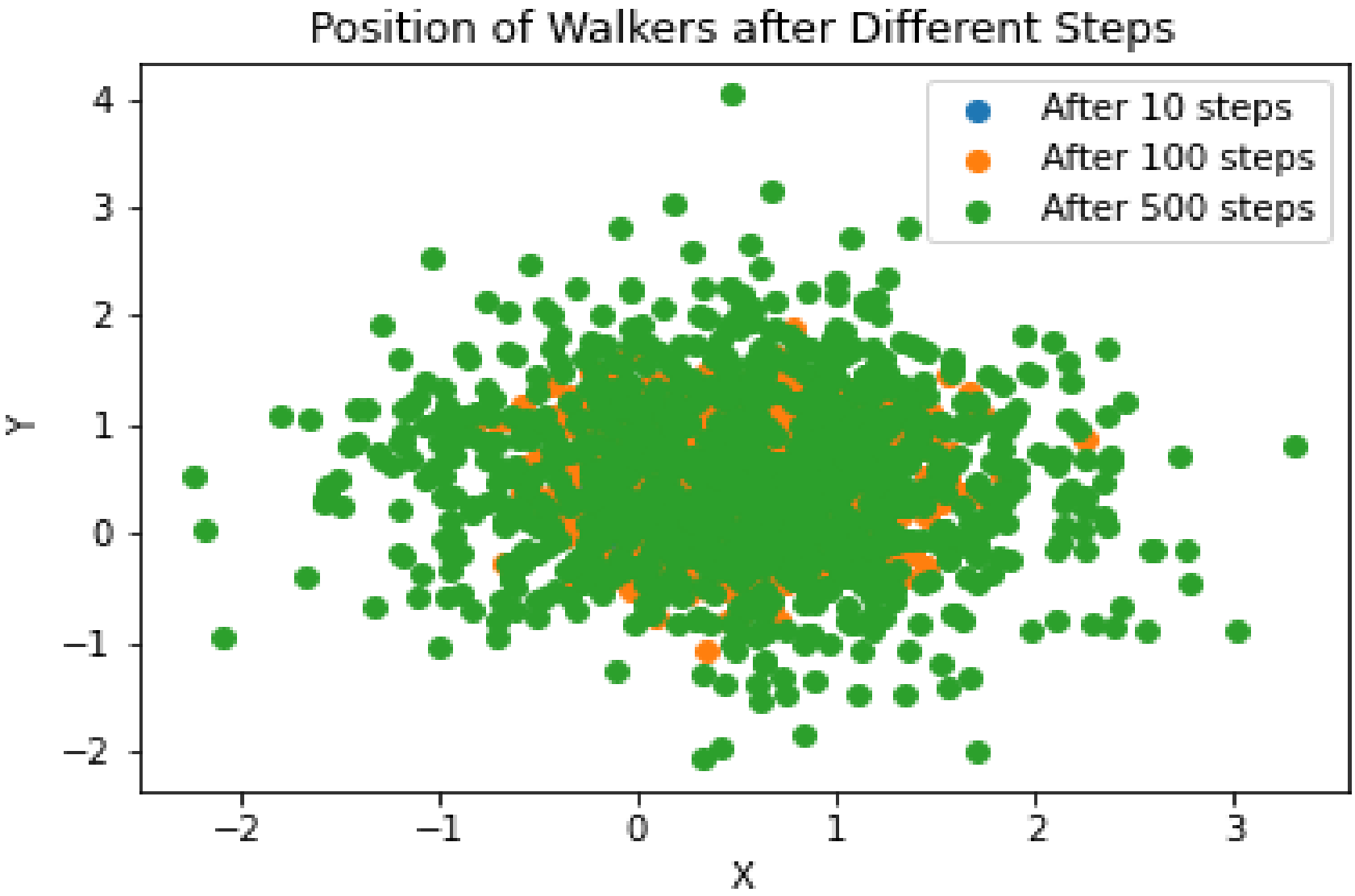

Distribution of Points Generated
Frequency
0.10
0.08
0.06
0.04
0.02
0.00
0
2
4
6
8
10
x


Convergence Comparison
Number of Iterations
Iteration
100
80
60
40
20
0
0
2
4
6
8
Newton-Raphson
Secant
Bisection


Gradient Descent Optimization of Banana Function
1e177
eta = 0.001
eta = 0.01
eta = 0.1
y
x
1e266
0
1
2
3
4
5
6


Average Position and Average Squared Position
Average Position
Average Squared Position
800
600
400
200
0
Position
0
200
400
600
800
1000
Number of Steps


100
80
60
40
20
0
0
20
40
60
80
100


Position of Walkers after Different Steps
After 10 steps
After 100 steps
After 500 steps
Y
X
4
3
2
1
0
−1
−2
−2
−1
0
1
2
3

AI?