

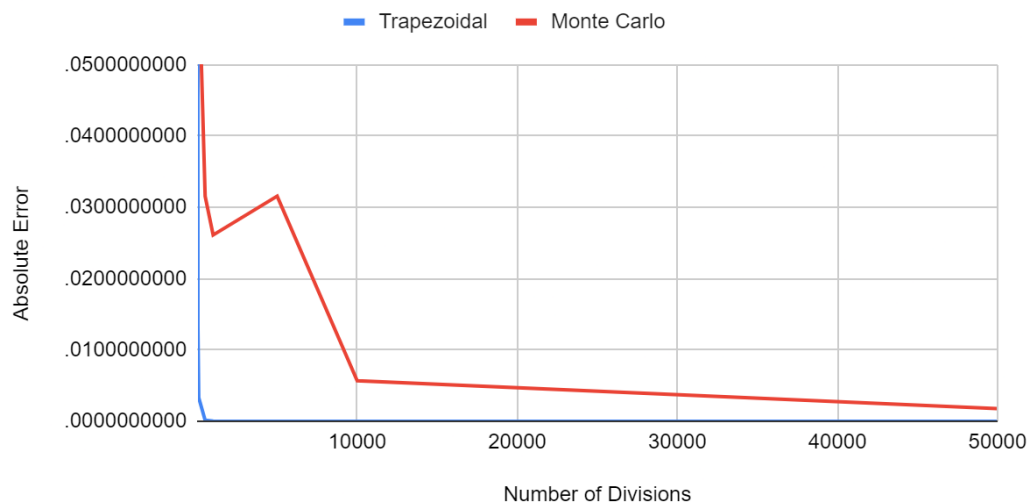
## ASSIGNMENT 1 ( ME 766 )

**2. Perform a convergence study, using different numbers of divisions (or sampling points), by comparing the integral obtained the numerical method with the analytical integral.**

- The Average Value for 5 runs is taken and Absolute Error is calculated for the Convergence Study for Monte Carlo and Trapezoidal Method

Divisions	Trapezoidal Rule		MonteCarlo method	
	Average Value	Error	Average Value	Error
10	1.9349832615	.0650167385	1.8472176472	.1527823528
50	1.9973693607	.0026306393	1.9270949219	.0729050781
100	1.9993421048	.0006578952	1.9368596673	.0631403327
500	1.9999736812	.0000263188	1.9684371596	.0315628404
1000	1.9999934203	.0000065797	1.9738826276	.0261173724
5000	1.9999997368	.0000002632	1.9684371596	.0315628404
10000	1.9999999342	.0000000658	1.9943294744	.0056705256
50000	1.9999999974	.0000000026	1.9982303081	.0017696919
100000	1.9999999993	.0000000007	1.9999902960	.0000097040
500000	2.0000000000	.0000000000	2.0003324189	.0003324189
1000000	2.0000000000	.0000000000	1.9998040974	.0001959026

**Convergence Study for Monte Carlo and Trapezoidal Method**



**3. Perform a timing study using 2,4,6 and 8 OpenMP threads. Be sure to report average times of at least 5 runs of the code.**

- The average timing study is provided for 5 runs of the Monte Carlo and Trapezoidal method for  $N = 1000000$  divisions

Number of OpenMP Threads	AVERAGE TIME FOR 5 CODE RUNS	
	Monte Carlo	Trapezoidal
2	0.0464	0.03836
4	0.0236	0.02048
6	0.0176	0.01484
8	0.016	0.01228

**Timing Study ( Trapezoidal and MonteCarlo )**

