**ME759**

**High Performance Computing for Engineering Applications**

**Assignment 10**

**Date Assigned: November 19, 2013**

**Date Due: November 25, 2013 – 11:59 PM**

The goal of this assignment is as follows:

- Getting familiar with OpenMP

**Problem 1**. Write a program that relies on OpenMP-enabled parallel programing to evaluate the integral



Note that the value provided by MATLAB for this integral is I = 32.121040688226245. To approximate the value of I use the following extended Simpson's rule:



In the approximation above, 

This value of n goes to say that you divide the interval [0, 100] in 106 subintervals when evaluating I.

After implementing the code, you will have to run the code on Euler using

- One computational thread (sequential execution)

- Using OpenMP on either an Intel (up to 8 physical and 16 virtual cores) or AMD (up to 64 cores) per box. Try to squeeze as much performance as possible out of the available hardware.

Answer:

For AMD (upto 64 cores) on Euler26

|  |  |  |  |
| --- | --- | --- | --- |
| Optimization flags | Serial timing | Parallel timing | Speed up |
| -o2 -ofast | 157.307705 ms | 6.7936 ms | 23.16 times (approx..) |

For Intel (upto 16 cores) on Euler01

|  |  |  |  |
| --- | --- | --- | --- |
| Optimization flags | Serial timing | Parallel timing | Speed up |
| -o2 -ofast | 130.115226 ms | 11.926627 ms | 10.9 times (approx..) |

This shows that AMD processor perform faster in case of parallel timing but in Intel perform faster in case of serial timing.