

## Numerical Integration

### Introduction:

For this implementation of numerical integration, the thread blocks stride over the function domain and compute their respective partial sums until the next step when half the remaining threads then sum across the partial sums. This process repeats until there is a single sum. This methodology is a form of tree style reduction. It leverages shared memory to rapidly access the sum array since the problem requires repeated accessing of the array.

### Results:

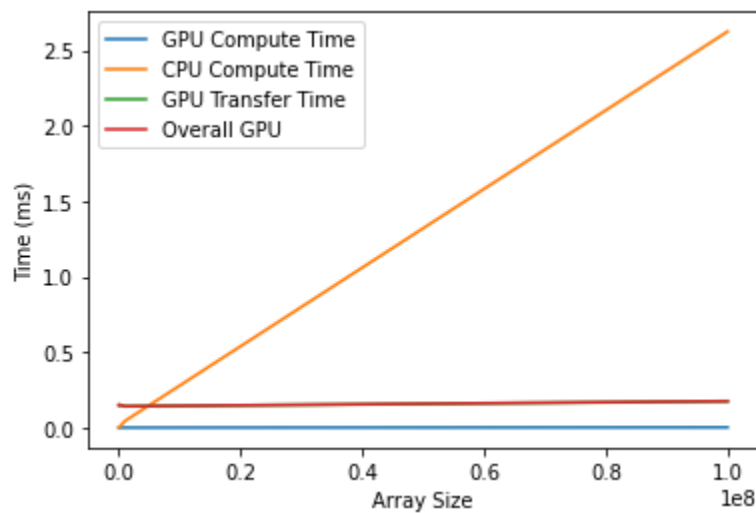


Figure 1: Computation time of CPU and GPU vs input size

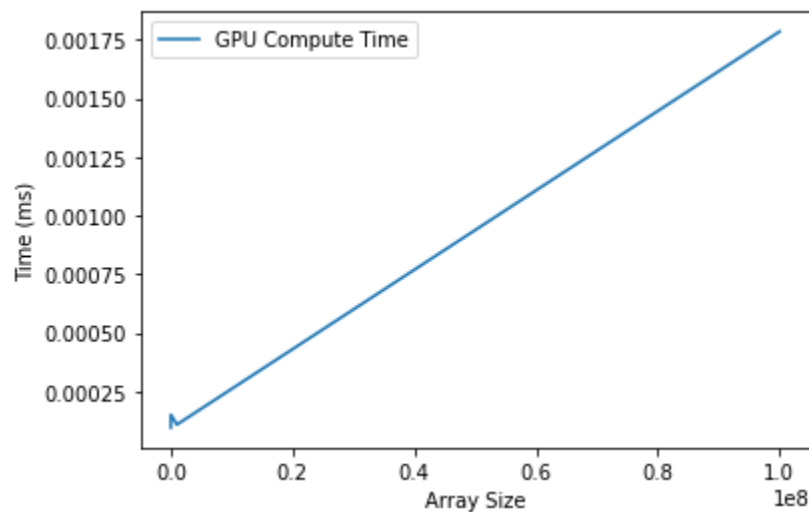


Figure 2: GPU computation vs input size

## Conclusion:

Based on the testing, GPU acceleration dramatically decreases computation time in all cases tested. Varying threadblock size was also tested but there did not seem to be any statistically significant difference in runtime around difference sizes.