Assignment 12 Report

High Performance Computing

Pratik Mitra

James Smith

1. Create and solve a dense system of equations using CuPy

• Evaluate the performance of the implementation with a large size N=30 000. Measure the CPU-time from the creation of the matrix and vector, until after printing the solution vector. Add this result into a short report document.

(hpc) [gpu033: assignment12]$ ipython testA12.py

N is : 30000

Time spent creating the matrix: 1.723190 s

Time spent creating f vector: 0.020833 s

Last value of u is : [0.5]

Total Time: 5.285626 s

• Evaluate the performance of this operation using only numpy functions (CPU only). For this you will need to use numpy functions in the CPU. Compare what is the speedup compared to the CUDA kernel and cupy solver execution. Add these results into a small report document.

The last value for the Numpy solution vector is : [0.5]
Total Time (Numpy): 150.147032 s

Speedup = 150.147032/5.285626 = 28.40666972