Parallel vs Serial Matrix Vector Multiplication – Basil Lin
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ECE 6730

Problem Size	Processors	Serial Time (s)	Parallel Time (s)	Speedup
10000	100	0.56	0.0329	17.02128
28561	169	4.59	0.246	18.65854
38416	196	8.77	0.305	28.7541

Total Serial Time: 13.92 seconds
Total Parallel Time: 0.584 seconds

Average Speedup = Total Serial Time / Total Parallel Time = 13.92 / 0.584 = 23.8
Speedup Percentage = Average Speedup * 100% = 2380%

The serial and parallel times were taken across a 12 run average. It should be noted that while these times may seem short of the 30s-3min recommendation, the times were taken only from the multiplication algorithm. As such, the full program needed 3-5 minutes to run, as the multiplication algorithm was the fastest part of both the serial and parallel programs, with file I/O being the slowest.

It should also be noted that while the binary output files for the serial and the parallel programs do not exactly match, they are due to slight rounding errors and will match to a significant degree of accuracy. The output values from smaller problem sizes have been checked with Matlab to verify correctness.