

CMPE 483 – Homework 1 Report

Results

Here are the results obtained from the different runs for different N and tolerance values. Default number of processors are used for the parallel runs.

N	Tolerance	Serial execution time (seconds)	Parallel execution time (seconds)	Speedup
10	0.001	0.003931	0.011513	-
	0.0001	0.005209	0.013977	-
	0.00001	0.006478	0.016033	-
20	0.001	0.116203	0.062458	1.860499
	0.0001	0.135265	0.078012	1.733901
	0.00001	0.15291	0.087046	1.756657
40	0.001	3.40765	1.00548	3.389077
	0.0001	4.13071	1.21978	3.386438
	0.00001	4.85434	1.43051	3.393433
80	0.001	127.756	28.9867	4.407401
	0.0001	153.907	35.6501	4.317154
	0.00001	179.361	40.7905	4.397126

Example Runs

Serial

```
atakan@Atakans-MacBook-Pro src % g++-11 -fopenmp -o serial-solver poisson-solver.cpp
atakan@Atakans-MacBook-Pro src % ./serial-solver
For N = 50, tolerance = 0.001
-----
Iteration count (t): 5369
Maximum error: 0.000999811
Execution time: 9.59069
atakan@Atakans-MacBook-Pro src % g++-11 -fopenmp -o serial-solver poisson-solver.cpp
atakan@Atakans-MacBook-Pro src % ./serial-solver
For N = 50, tolerance = 0.0001
-----
Iteration count (t): 6489
Maximum error: 9.98867e-05
Execution time: 11.5835
atakan@Atakans-MacBook-Pro src % g++-11 -fopenmp -o serial-solver poisson-solver.cpp
atakan@Atakans-MacBook-Pro src % ./serial-solver
For N = 50, tolerance = 1e-05
-----
Iteration count (t): 7608
Maximum error: 9.99981e-06
Execution time: 13.5813
```

Parallel

```
atakan@Atakans-MacBook-Pro src % g++-11 -fopenmp -o solver poisson-solver.cpp
atakan@Atakans-MacBook-Pro src % ./solver
For N = 50, tolerance = 0.001
-----
Iteration count (t): 5369
Maximum error: 0.000999811
Execution time: 2.4205
atakan@Atakans-MacBook-Pro src % g++-11 -fopenmp -o solver poisson-solver.cpp
atakan@Atakans-MacBook-Pro src % ./solver
For N = 50, tolerance = 0.0001
-----
Iteration count (t): 6489
Maximum error: 9.98867e-05
Execution time: 2.92478
atakan@Atakans-MacBook-Pro src % g++-11 -fopenmp -o solver poisson-solver.cpp
atakan@Atakans-MacBook-Pro src % ./solver
For N = 50, tolerance = 1e-05
-----
Iteration count (t): 7608
Maximum error: 9.99981e-06
Execution time: 3.42266
```
